

CANADIAN MACHINERY

AND MANUFACTURING NEWS

A weekly newspaper covering in a practical manner the mechanical power, foundry and allied fields.

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BERTRAM MACHINE TOOLS

30 in. Vertical Drilling Machine

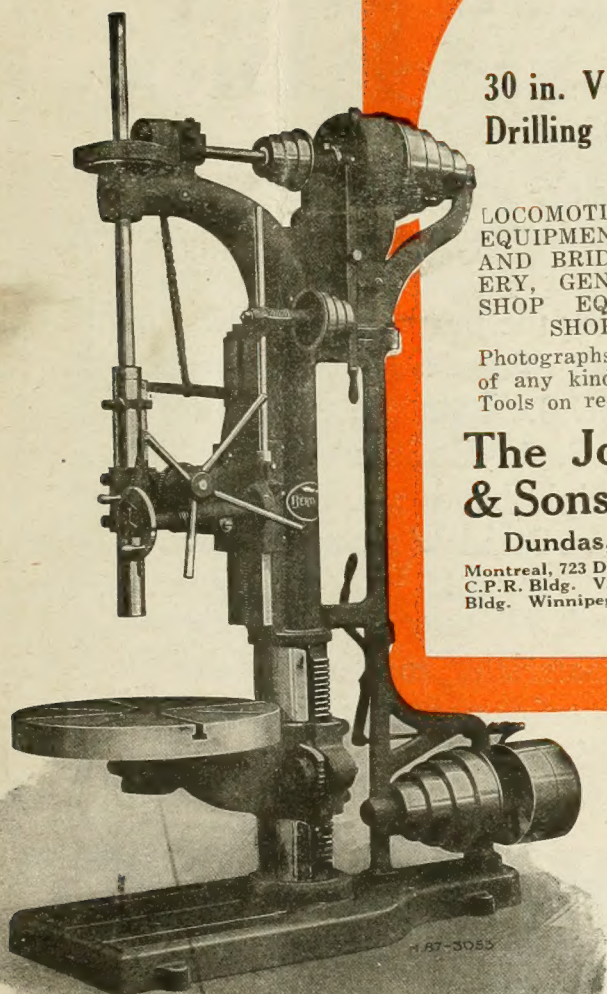
LOCOMOTIVE AND CAR SHOP
EQUIPMENT. STRUCTURAL
AND BRIDGE SHOP MACHIN-
ERY. GENERAL MACHINE
SHOP EQUIPMENT, REPAIR
SHOP MACHINERY.

Photographs and full particulars
of any kind of Bertram Machine
Tools on request.

The John Bertram & Sons Co., Limited

Dundas, Ontario, Canada

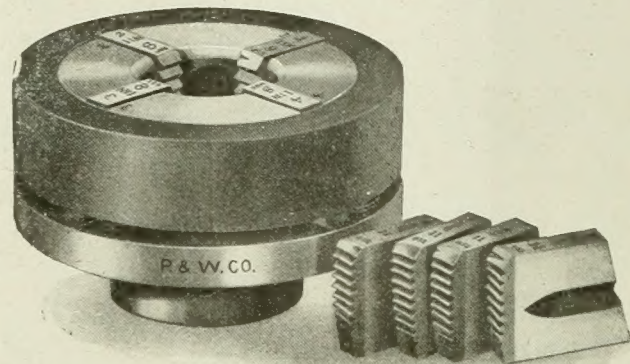
Montreal, 723 Drummond Bldg. Toronto, 1002
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SMALL TOOLS

PROMPT SERVICE

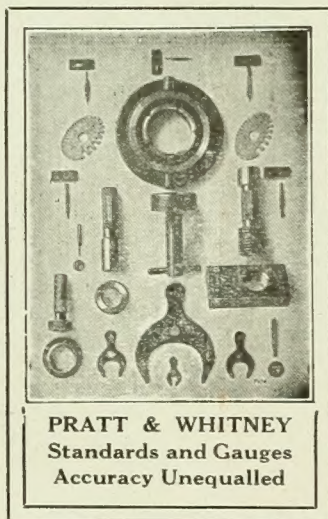
is assured at our nearest store where P. & W. Small Tools are carried in stock. Place your order there to-day.



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These dies are practically solid when in use and can be adjusted 1-32 in. larger or smaller. The chasers can be quickly removed for the purpose of renewal or sharpening. Standard sizes furnished include U.S. Standard, Whitworth Standard, S. A. E. Standard and "V" form, all right hand; also special right-hand Briggs Standard taper pipe thread.

The Pratt & Whitney policy of highest quality materials, together with the necessary refinement and accuracy, is maintained.



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Standards and Gauges
Accuracy Unequaled

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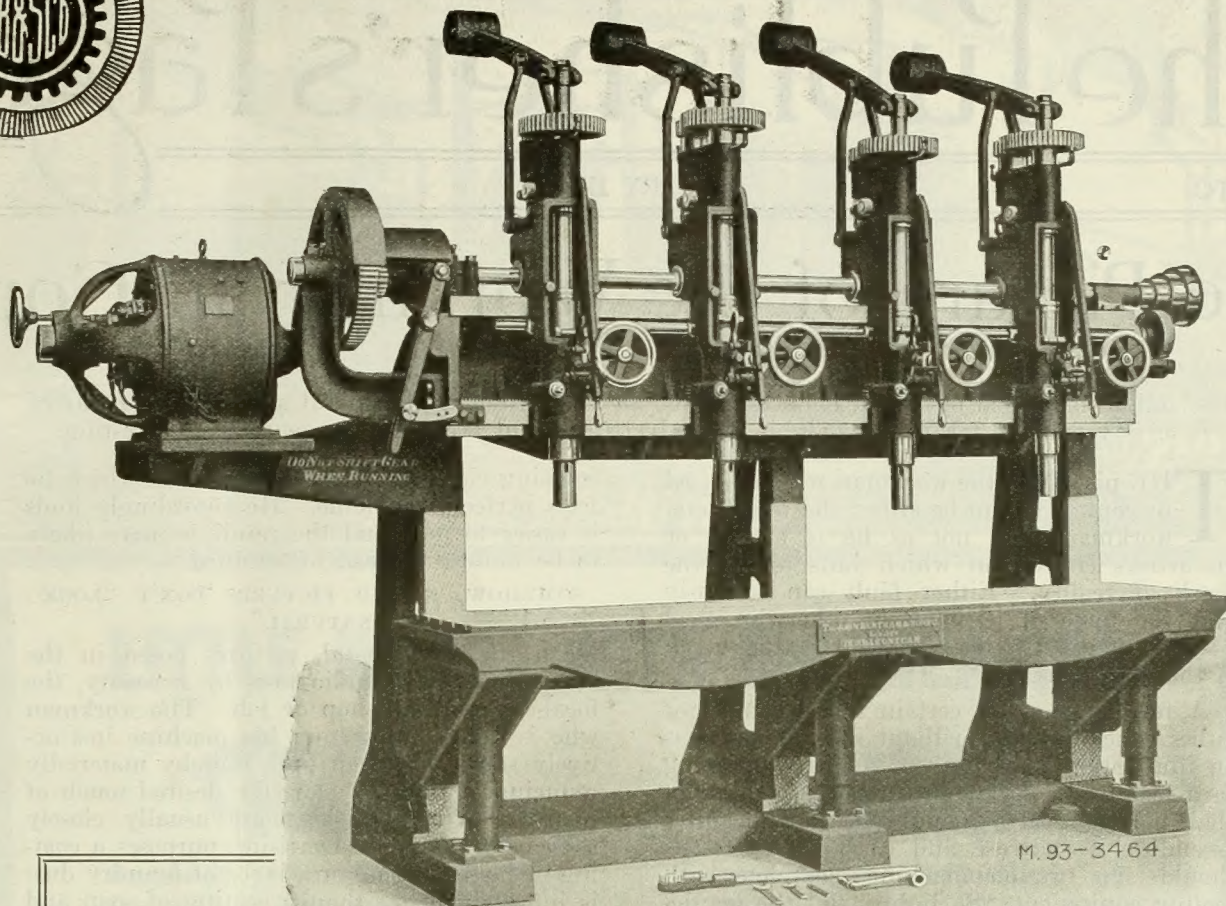
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SIMULTANEOUS OR INDEPEND-
ENT FEEDS with INDEPENDENT
KNOCK-OFF FOR EACH HEAD
AND CLUTCH DRIVE FOR EACH
SPINDLE.
CAPACITY, FOUR 2-inch HOLES
IN STEEL.

Drop us a line for photographs and
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The John Bertram & Sons Company Limited

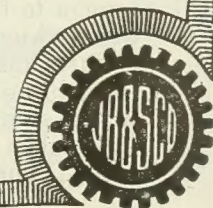
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The Publisher's Page

TORONTO

JANUARY 25, 1919

The Picture of the Workman in Copy

BY R. BIGELOW LOCKWOOD

The following article by R. Bigelow Lockwood in that wonderfully useful publication, *Printers' Ink*, is reprinted for the benefit of our advertisers, and because it is generally interesting.

THE picture of the workman which is used in copy is apt to be either the traditional workman, and not as he is to-day, or an artist's conception which fails to hit the mark of reality. Either fault can seriously mar the force of perhaps an otherwise good advertisement, if it does not add a fatal touch of the ridiculous.

A few years ago a certain manufacturer of lathes conceived the brilliant idea of using as an illustration in his advertisement appearing in a technical paper a picture of a gentleman clad in frock coat and high silk hat, gleefully ascending a staircase and carrying upon his shoulders a two-ton machine, complete with tooling equipment. So lightly did the gentleman in question carry his burden that not a wrinkle showed in his faultlessly fitting coat, nor was the grain of his hat rubbed the wrong way. As an example of mis-directed originality carried to the *n*th degree the illustration was a gem. As an illustration of force, capable of properly advertising the product, the picture was of no value.

Between this extreme and the safe and sane policy of illustrating the workman as he really is, lies a no-man's land strewn with advertising debris in the form of countless pictures which fail in varying degrees accurately to portray the workman as he exists on the job.

Realism, however, is a thing which must be handled with care. The writer of this article, while directing the taking of photographs in a machine shop, has occasionally had to request a mechanic who was prominently in the foreground, to shift his plug to the cheek away from the camera. Realism, while a virtue, should never be carried to the point of possible offense.

The best results are secured by taking the camera to the workman rather than by taking the workman to the camera. In other words, pictures taken in the shop, or factory or on the job, are usually better than pictures posed in the studio. The reasons are obvious. Pictures taken on the job have the proper environment. The workman is caught in his proper

working clothes amidst conditions in which he feels perfectly at home. He accordingly finds it easier to pose and the result is more likely to be natural instead of strained.

SOMEHOW, STUDIO PICTURES DON'T "LOOK NATURAL"

On the other hand, pictures posed in the atmosphere of a studio lose, by necessity, the local-color of the shop or job. The workman who is taken away from his machine instinctively starts to "clean up," thereby materially reducing at the very start the desired touch of reality. Work and dirt are usually closely associated, and for advertising purposes a coating of honest grease or a layer of foundry dust is infinitely better than a coating of soap and water. The one is true to life; the other is artificial as applying to actual working conditions. Hence, in this case, dirt is a thing to be respected and duly honored because of its advertising value.

Whenever possible, therefore, photograph the workman at his machine, and do it without giving him too much time to think about what is happening.

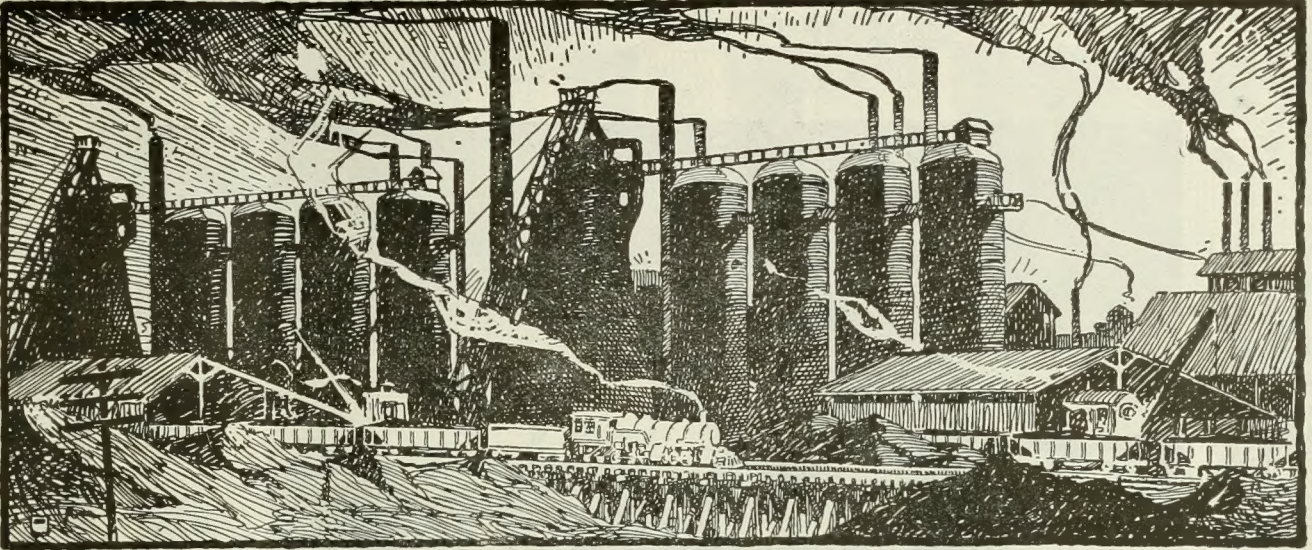
The request, "Stand still there a minute, Jim," will usually produce far better results than the command, "Come upstairs, Jim, to Mr. Tompkins' office. We want you to pose for a picture."

In the latter case Jim will not only get flustered, but on the way will probably stop in the washroom to "spruce up a bit."

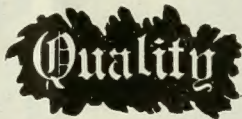
Where it is desired, for advertising purposes, to show the workman in connection with the actual job, it is, of course, essential to take the picture on the ground. It often happens, however, that a picture is wanted featuring the workman alone, or in the simple act of pointing to some such device as a wrench, held in one hand. Such pictures usually call for a pleased expression on the face of the workman, and it is right here that grave mistakes can all too easily be made, due to the common practice of getting Smith, the office bookkeeper, to slip on a pair of overalls and pose.

After much coaxing Smith sheds his coat

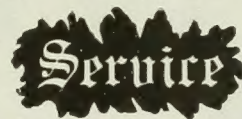
CONTINUED ON PAGE 71



LITTLE WORDS WITH BIG MEANING



According to "Webster,"
Quality is "an excellence
of character; natural
superiority."



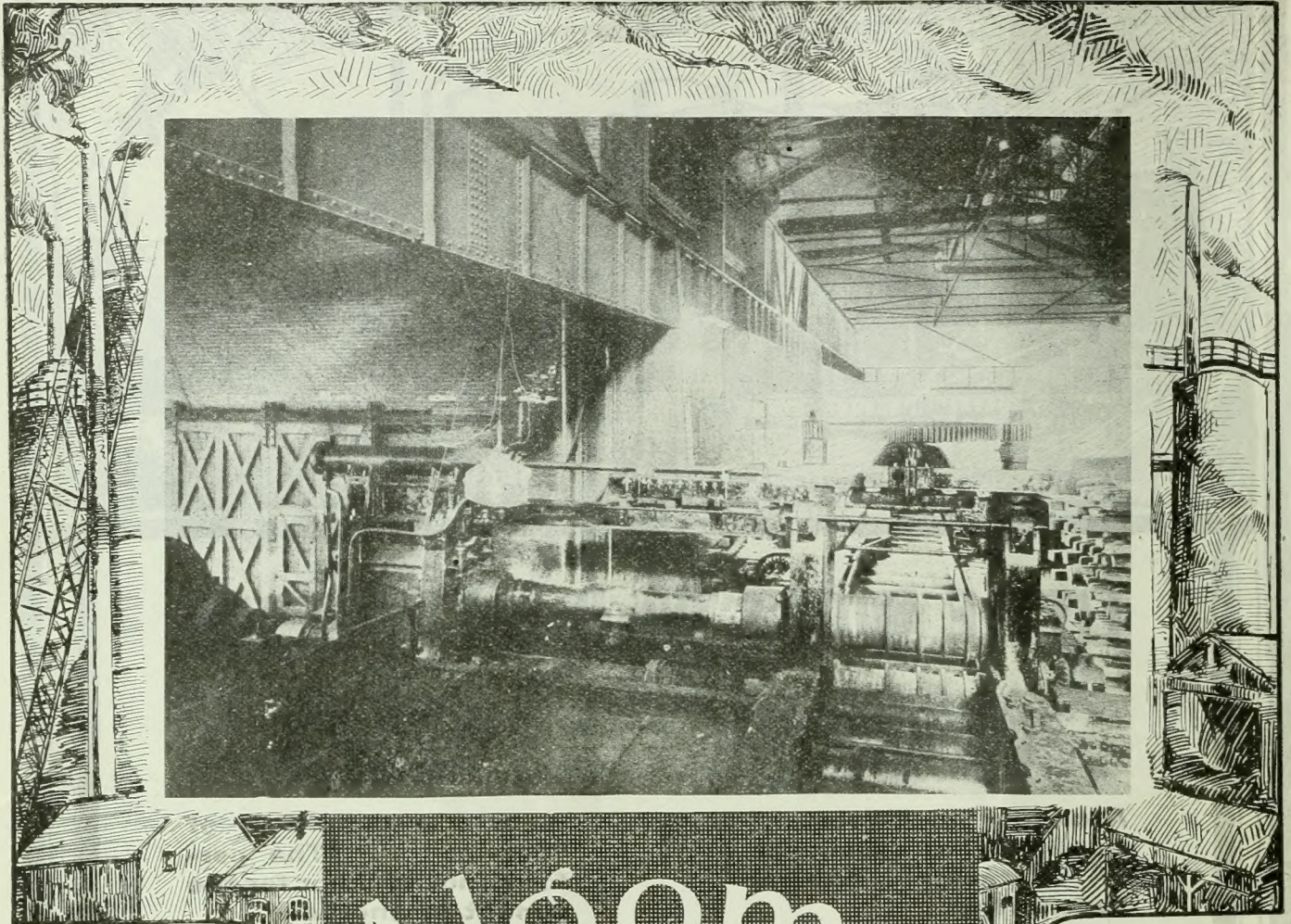
Webster's definition of
"Service" is: "The per-
formance of labor for the
benefit of another."

We use these words advisedly—fully understanding their definitions—and realizing the obligation we place upon ourselves by their continued use in connection with our products of Iron and Steel, and our attitude to the people we serve.

THE
STEEL COMPANY
OF
CANADA
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MONTREAL HAMILTON

Pig Iron,
Steel & Iron Bars,
Horse Shoes,
Steel and Iron Products.

Steel Billets,
Track Spikes &
Bolts, Forgings, Wire
of every description.



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BILLETS,
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RAILS**

Open Hearth Quality
(All Sections from 12 lbs
to 100 lbs per yard)

**SPLICE
BARS**

**STEEL
TIE PLATES**

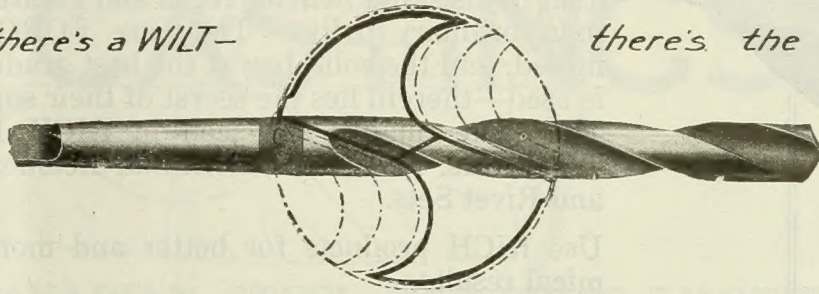
**PIG IRON
BASIC, FOUNDRY-
BESSEMER**

**SULPHATE OF
AMMONIA**

WILT

"Where there's a WILT—

there's the Way"



HIGH SPEED AND CARBON TWIST DRILLS

IN these days tools greatly define the extent of your production. The skilled mechanic, as good as he may be, must be supplied with good tools to turn out **quantity** and **quality** work. For drilling operations he must have drills of WILT quality—drills that can be driven hard and pushed to the limit, and a little beyond. Wilt Drills are designed to speed up production. You can rotate them at a greater speed than the average drill and thus produce a greater number of holes in a given time. They have the **quality** that endures and guarantees the best of drill service.

Wilt High Speed and Carbon Twist Drills are known as the standard drill in many of Canada's largest shops—a trial will prove their merits.

Wilt Twist Drill Company of Canada, Limited
WALKERVILLE **ONTARIO**

London Office: Wilt Twist Drill Agency, Moorgate Hall, Finsbury Pavement, London, E.C. 2, England.



Drills for Heavier Feeds and Greater Speeds

Rich Drills stand heavier feeds and greater speeds than ordinary drills. They are FORGED, not milled, and the solid bar of the best grade of steel is used—therein lies the secret of their superiority. The same quality are seen in RICH Reamers, Track Bits, Flat Drills, Drill and Reamer Chucks and Rivet Sets.

Use RICH products for better and more economical results.

MACHINERY AND SUPPLIES—We have the facilities for adequately equipping all kinds of factories and mills. Modern ideas—quick service.

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Machinery
Machine Tools
and Mill Supplies

**Coal
Coke
Iron Ore**

Pig Iron

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Canadian Office:
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FIRTH'S

Speedicut ^{HIGH} SPEED Steel

The Ideal Steel for Machining Shells

FIRTH'S CARBON TOOL STEELS

Standard Brands Highest Quality

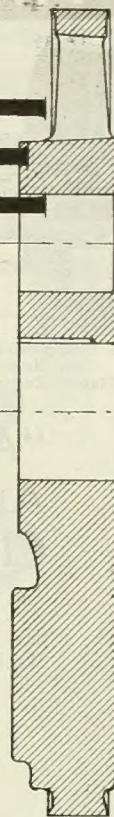
THOS. FIRTH & SONS, Limited, Sheffield, England

CANADIAN WAREHOUSES | 449 St. Paul St. West, MONTREAL
79 West Adelaide St., TORONTO

J. A. SHERWOOD
Canadian Manager

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CANADIAN STEEL FOUNDRIES, LIMITED
Transportation Building
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Electrite

Electric furnaces, automatically regulated, the most modern methods, and the introduction of Uranium — make this a steel of truly remarkable cutting properties.

We know "Electrite" cannot be bettered — and stand ready to prove it to you.

LATROBE
ELECTRIC STEEL CO.
LATROBE, PA.

High Speed Steel

uranium

Forging Billets and Bars
Electric Furnace

Alloy Steels

Die Blocks

Annealed

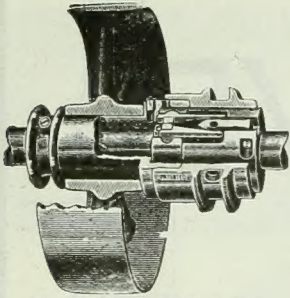
Piston Rods Rough Turned
Annealed

Blue Ribbon

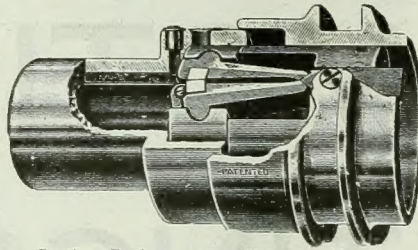
High Speed Steel

General Steel Company
Milwaukee, Wisconsin
DETROIT - 823 Dime Bank Building

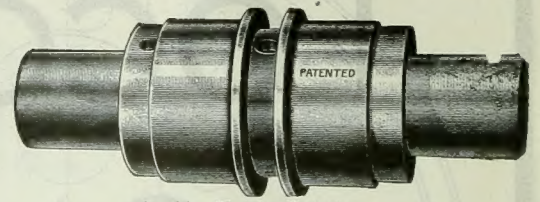
THE JOHNSON FRICTION CLUTCH



Single Clutch with Pulley
on Hub
(Clutch Engaged)



Section Broken Away Showing Clutch
Disengaged



Double Clutch—Exterior

**"A Machine is
As Good As Its
Clutches"**

We are always ready to talk over any mechanical problem to which clutches may be applied and help the designer or machine tool builder. If our various types of clutches do not meet your needs we are prepared to make any modifications which may be necessary.

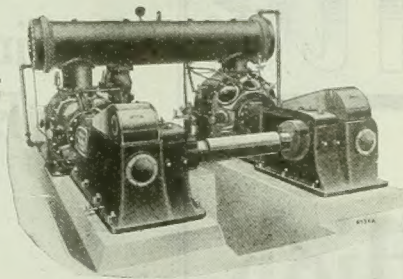
Send for our Yellow Data Sheets giving complete description of small compact clutches for use on feed and speed changes on Machine Tools. Also our Booklet, "Clutches as Applied in Machine Building."

AGENTS: CANADA—Williams & Wilson, 320 St. James St., Montreal; The Canadian Fairbanks-Morse Co., Ltd., Toronto and Branches. ENGLAND—The Elandem Co., Ltd., 22 Newman St., Oxford St., London, W 1, Sole Agents for British Isles. AUSTRALIA—Edwin Wood Pty., Hdqrs. Chambers, 231 Elizabeth Street, Melbourne, Victoria. JAPAN—Andrews & George Co., 16 Takegawacho, Kiobashiku, Tokyo. SOUTH AFRICA—D. Drury & Co., Main Street, Johannesburg. FRANCE—Anciens Etab. Glaenger & Perreaud, 18 Fauborg du Temple, Paris.

THE CARLYLE JOHNSON MACHINE CO. MANCHESTER CONN.

For reconstruction work Canada needs compressed air. For pumping by the air-lift system, for hoists in all classes of work, for pneumatic riveters, chippers, drills, and grinders in structural work and in the shops. For spraying paint, cleaning out electric motors, operating air chucks, etc.

Use compressed air.



Air Compressors

For all these uses of compressed air you must have a reliable source of supply. C-I-R-Co air compressors are reliable at all times; for steady, continuous operation they have no superior. They come from a plant that has been manufacturing compressed air machinery for twenty-five years.

Our experience counts.

CANADIAN INGERSOLL-RAND COMPANY

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Sherbrooke

Montreal

Toronto

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Winnipeg

Nelson

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BETTS

Slotting Machines

Centralized Control

The complete line of Betts Heavy Duty Slotting Machines are so arranged that all drive and feed controls are operated from one position.

Thus the operator can command full use of them and at the same time watch the cutting tool.

The importance of this feature cannot be overestimated.

It means that every movement is under absolute control of the operator without his moving from one operating position.

It means time saved, with consequent less expense; and it means more work turned out in the same length of time.

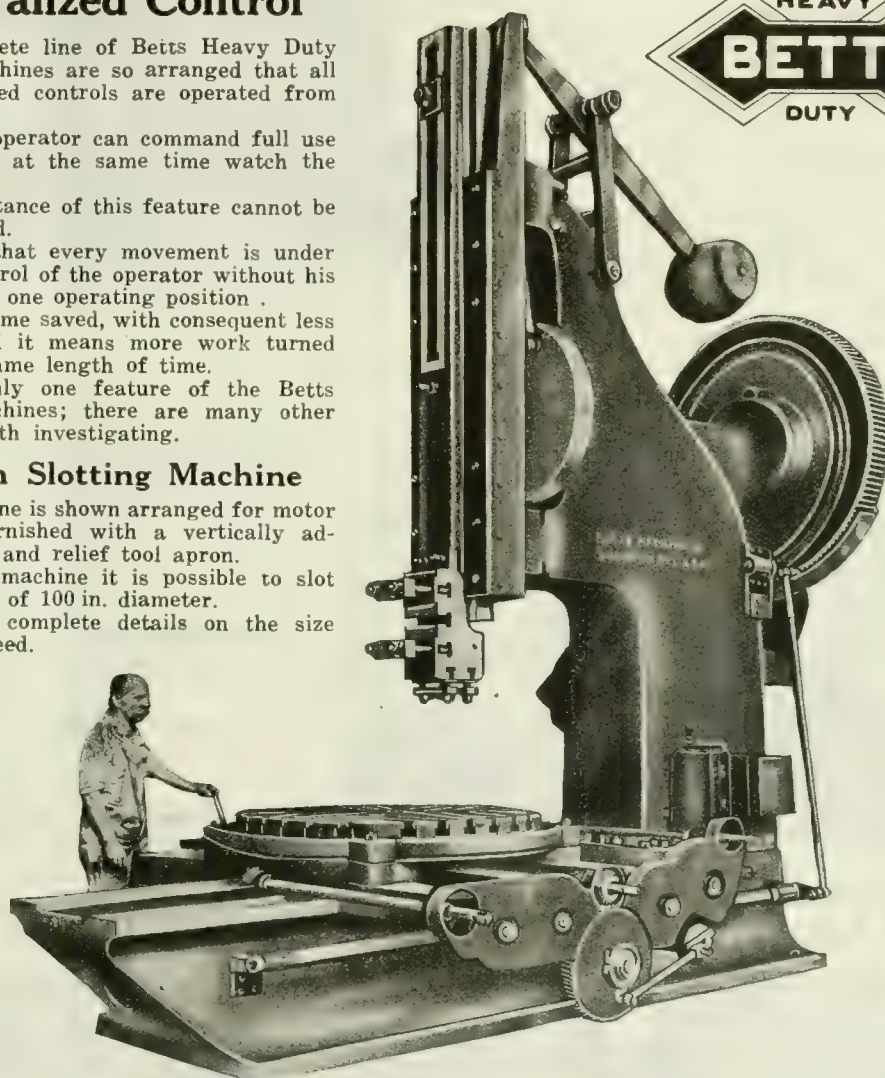
This is only one feature of the Betts Slotting Machines; there are many other features worth investigating.

30 Inch Slotting Machine

This machine is shown arranged for motor drive; is furnished with a vertically adjusted guide and relief tool apron.

With this machine it is possible to slot in the centre of 100 in. diameter.

Write for complete details on the size slotter you need.



Planers
Car Wheel Borsers

Boring and Turning Mills
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408 Blossom Rd. Rochester, N.Y.

Formerly of WILMINGTON, DEL.

FORD-SMITH MILLING MACHINES

Our Millers are built in four sizes

2 Sizes Plain

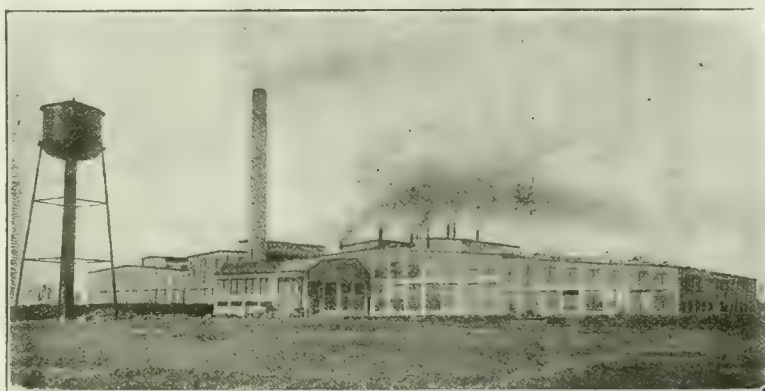
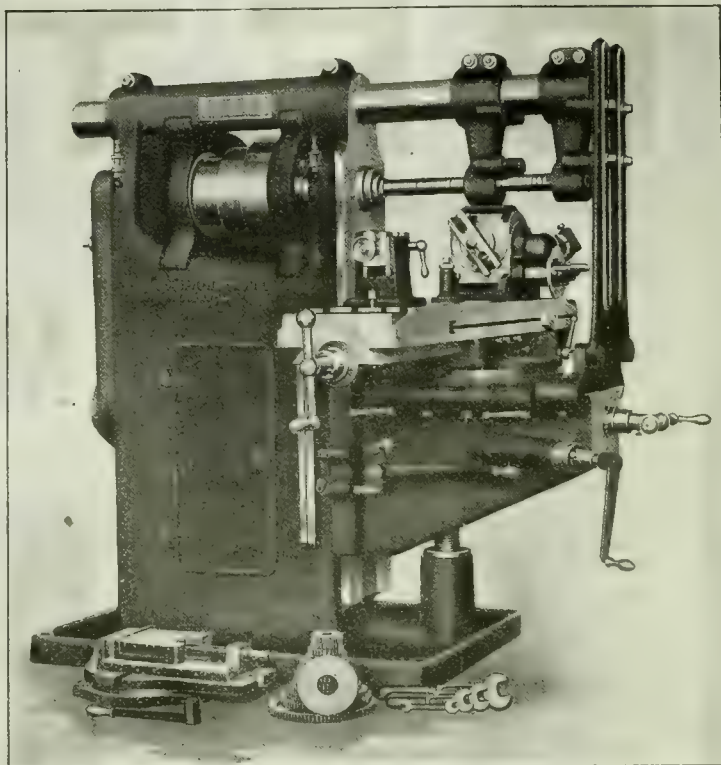
2 Sizes Universal

Our latest Catalogue describes these machines in detail

FORD-SMITH MACHINE CO. LIMITED

*Manufacturers of Milling Machines
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HAMILTON, ONT. :: :: CANADA



STAINLESS STEEL FOR CUTLERY PURPOSES

Prices On Application

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IMPERIAL GENUINE BABBITT METAL *The Highest Grade Manufactured*



Made specially for all HIGH SPEED, HEAVY ENGINES and EXTRAORDINARY HARD WORK

Manufactured and guaranteed to give excellent service by

**THE CANADA METAL COMPANY, Limited, FRASER AVENUE TORONTO, Hamilton, Montreal
Winnipeg, Vancouver**

If what you need is not advertised, consult our Buyers' Directory and write advertisers listed under proper heading.



"Not Steel but its Master"

STELLITE is now recognized as the master Cutting Metal, and has won for itself, during the War, a reputation in the Machine Shop not enjoyed by any steel.

STELLITE is hard, tough, acid-resisting, and is immune to heat up to 2000° F. — it might help you out of some mechanical difficulty. Why not talk it over with our Service Department?

The foremost Engineering Shops in Canada and the United States are now using it in a variety of ways and constantly increasing its use and their own production.

Deloro Smelting & Refining Company, Limited

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200 King Street West

H.O. and WORKS: DELORO, ONT.

MONTREAL
315 Craig Street West

WAR is destructive. Peace is constructive. War has taught us many things, chief of which is the great value of Time. Time is the essence of your life and mine. Whatever saves Time, saves Life.

"Red Cut Superior"

The Nationally Known **FIRST QUALITY**

HIGH SPEED STEEL

Is the avowed Enemy of Waste and Inefficiency, and allied with Life. Save Time, Save Life

Are your Tools made of 'Red Cut'?

VANADIUM-ALLOYS STEEL CO.

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Works, LATROBE, PA.

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BUFFALO
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Swedish Steel & Importing Co., Limited

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Direct representatives
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Tool Steels

ALLOY STEELS, BILLETS,
BARS, DISCS, SHEETS,
HIGH SPEED STEELS,
DRILL RODS, DRAWN
BARS, SEAMLESS TUB-
ING, COLD ROLLED STRIP
STEEL, WELDING WIRE,
WROUGHT AND ROLLED
IRON, PIG IRON, STEEL
AND IRON ENDS, HOL-
LOW AND SOLID MINING
DRILL STEEL.



PROMPT SHIPMENTS
from large stock



A
Keen
Cutter

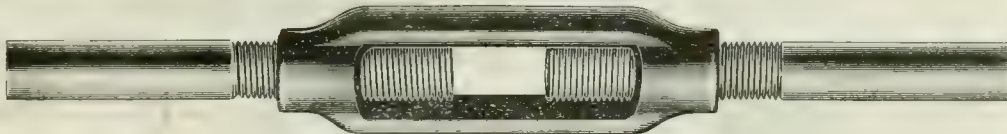
WOLFRAM
Is Both

VULCAN CRUCIBLE STEEL CO.
ESTABLISHED 1900
Aliquippa, Pa. U.S.A.
Represented in Canada by Messrs Norton
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MONTREAL

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in the
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CANADA FOUNDRIES & FORGINGS LIMITED

DROP FORGED STEEL



TURNBUCKLES

16 Sizes, with or without Stubs
Large Stock---Quick Action

Produced at

Canadian Billing & Spencer Plant
Welland



Rivet Speed

One every second is a speed which this Grant Rivet machine will keep up indefinitely, in any degree of tightness or looseness desired. Each rivet is finished with perfectly shaped head, polished and with no hammer marks showing.

We claim this is the only machine manufactured that will accomplish this feat. Our claims are unchallenged. By writing for our catalogues you may obtain full information regarding the ability of this machine.

We are rivet machine specialists. Get in touch with us.

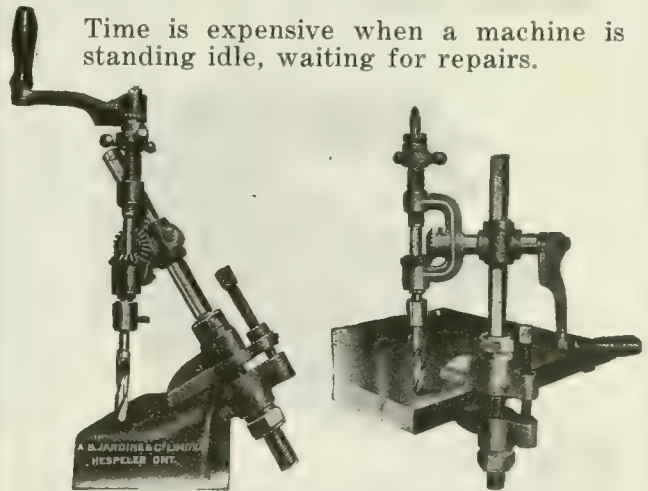
Grant Man'fg. & Machine Company

Holland Avenue

Bridgeport, Conn., U.S.A.

Jardine Universal Ratchet Drill

Time is expensive when a machine is standing idle, waiting for repairs.



On the average repair job, this machine completes the drilling in less than the time required to set an ordinary ratchet to begin.

Weight, 40 lbs. Price, \$26.50 net.

Sold by all Machinery and Supply Houses

A. B. JARDINE & CO., Limited

HESPELER, ONTARIO

“WACO”

TRADE MARK



TRADE MARK



High Speed Steel

“Double Waco” Quality—for
Quick Production Work

“Turtle Brand”—High-class
Tool Steels, Files, Drills, etc.

MANUFACTURED BY

WM. ATKINS & COMPANY, LIMITED
RELiance STEEL WORKS Established 1870 SHEFFIELD, ENGLAND

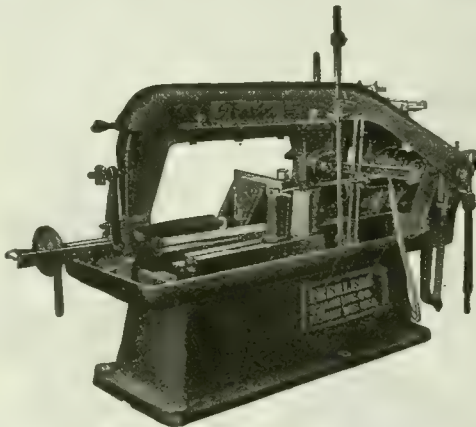
*Sole Representatives
for Canada*

GEO. A. MARSHALL & CO.

1118 Queen Street West, Toronto, Ontario

*Phone Park.
250*

Peerless **HIGH
SPEED**
THE NEW STANDARD
Increases Production 50 to 100%



Why Not?

WHEN big plants of national reputation, who are using three, six, eight, twelve and up to thirty or more Peerless Machines say that they increase production from 50 to 100 per cent., saving in time, labor, blades and expensive material;

AND WHEN we are willing to have you try out the Peerless for 30 days' at our own risk and expense, we paying freight both ways if it fails to make good;

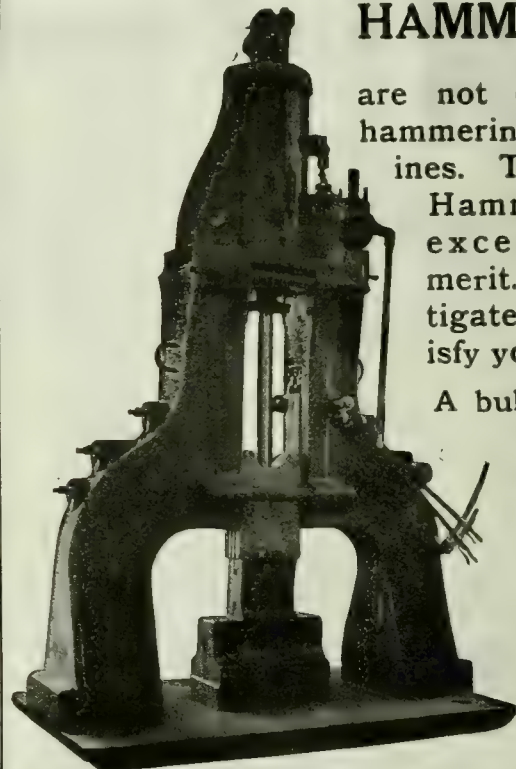
THEN WHY NOT try it out for yourselves, when the gain is more yours than ours if it makes good, and if it fails the loss is ours alone?

PEERLESS MACHINE CO.

1607 RACINE STREET

RACINE, WISCONSIN

“ERIE” STEAM FORGING HAMMERS



are not ordinary
hammering mach-
ines. They are
Hammers of
exceptional
merit. Inves-
tigate and sat-
isfy yourself.

A bulletin for
the ask-
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ERIE FOUNDRY COMPANY
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STEEL *for*

Every Commercial Purpose

We are the only company in Canada producing steel ingots by the "HARMET" Liquid Process, a process that makes these ingots vastly superior to the ordinary kind, improving the physical properties and reducing the waste of ingot.

We can supply forgings of all shapes and sizes made of ordinary or "HARMET" Fluid Compressed Open-Hearth Steel on the Shortest Notice.

**Nova Scotia
Steel and Coal
Co., Limited**

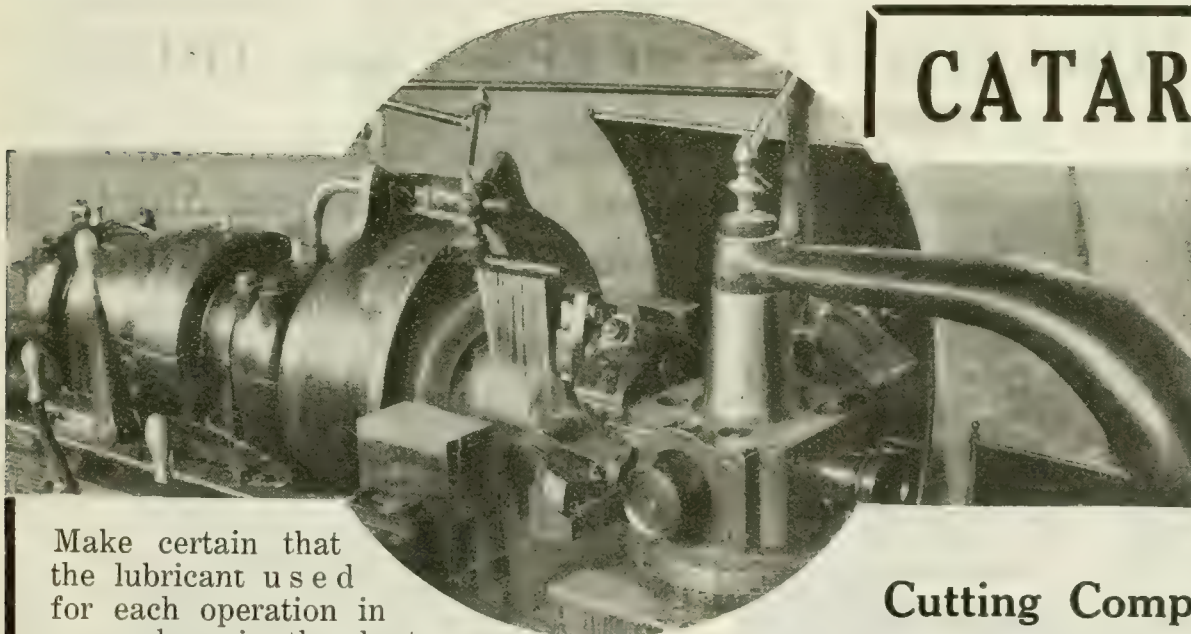
Head Offices:
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MONTREAL



Steel Ingots
by the

HARMET
Liquid Process



CATARACT

ACME
MYSTIC
SPECIAL

Make certain that the lubricant used for each operation in your shop is the best obtainable for the purpose. Otherwise your men and your tools and your machines work at a disadvantage.

Write us to-day that we may demonstrate how Cataract Lubricants can increase production and reduce cost in your plant.

**Cutting Compounds
Drawing Compounds
Cutting Oils
Quenching Oils**

Cataract Refining Company, Limited - Toronto, Ont.

Chapman

Double Ball Bearings

CONSERVE POWER! There is too much power going to waste the world over. This fact has been noted by the British Government and sweeping reforms are contemplated in Great Britain.

Canada also wastes much power. A reform is necessary here, too. Babbitt bearings are being used too often where **Chapman Double Ball Bearings** should prevail. The adoption of Chapman Double Ball Bearings, wherever an axle or shafting needs support in the transmission of power, results in a saving of 75% of friction loss.

Now in use in over 2,000 Canadian factories. Fit any adjustable hanger. Adopted by Canadian and United States Governments.

Write for full story of their efficiency.

Chapman Double Ball Bearing Company of Canada, Ltd.

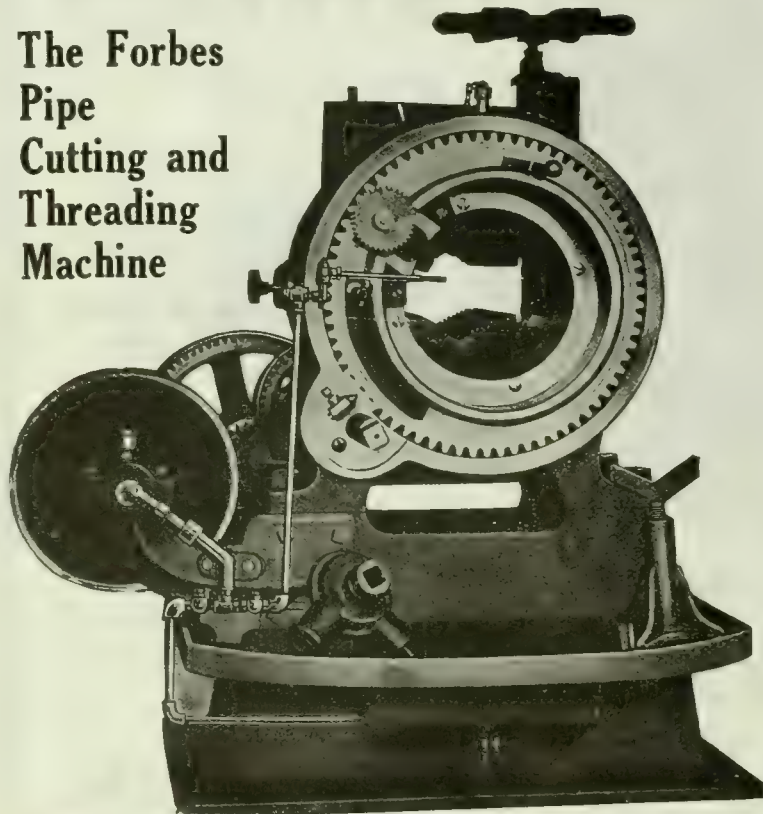
Room 408 Shaughnessy Bldg., Montreal. 339-351 Sorauren Ave., TORONTO, Canada.

Transmission Ball Bearing Co., Inc., 1050 Military Road, Buffalo, N.Y.



CUTS THREADS FAST, CLEAN and TRUE

The Forbes
Pipe
Cutting and
Threading
Machine



*One man can do the work
of six against old Stock
and Die method of cutting*

These are not exaggerated statements—they are facts that are being proven every day by Forbes' Users. Inquire for yourself. Investigate its performance closely and you can't help but admit its labor-saving, perfect-working value.

Inexpensive to Operate

It is simple, compact, self-contained, and all wearing parts are adjustable. One man can operate it and for heavy pipe work it can be taken right to the job. Fitted with self-centering vise that holds the heavy pipe stationary, while the dies turn around it. The latter are clamped and released by a throw of the lever.

Write for our latest bulletin
giving full details

THE CURTIS & CURTIS CO.

Garden Street, Bridgeport, Connecticut, U.S.A.

Do These Advantages Appeal

To Your Sense of Economy and Efficiency?

It's economy — requires one-half the space; costs less than half; no chimneys or flues required; instantaneous and perfect control of temperature; higher temperature obtained; no coal ash handlers required; no coal or ash piles; less waste of fuel, because it is shut off instantly; requires much less time to get the required heat. *Can you afford to lose the Advantages of this oil Furnace?*

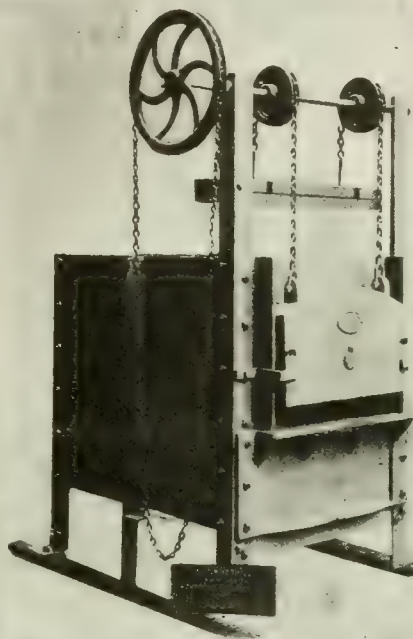
OIL FURNACE

VERSUS

COAL FURNACE

Write To-day for Full Particulars.

Mechanical Engineering Company,
55 Cote Street **Limited** **Montreal**
Que., Canada
PHONE MAIN 3585 **Cable Address: "Mecol"**

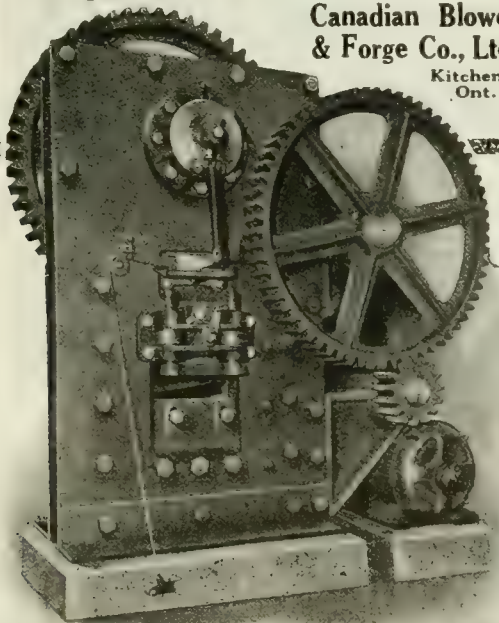


CANADIAN ARMOR PLATE

PUNCHES, SLITTING SHEARS, and BAR CUTTERS are dependable. They are built of "Armor Plate" steel—tensile strength 75000 lbs. per square inch—7½ times as strong as cast iron.

That means a lighter and stronger machine—a machine built to take a lot of punishment. Write for Catalog P/S-16.

**Canadian Blower
& Forge Co., Ltd.**
 Kitchener
 Ont.



IMPERIAL CARBIDE



For
 Welding
 Cutting
 and
 Lighting



Manufactured by
Union Carbide Co. of Canada, Ltd.

Head Office:
 Dominion Bank Bldg.
 TORONTO, ONT.

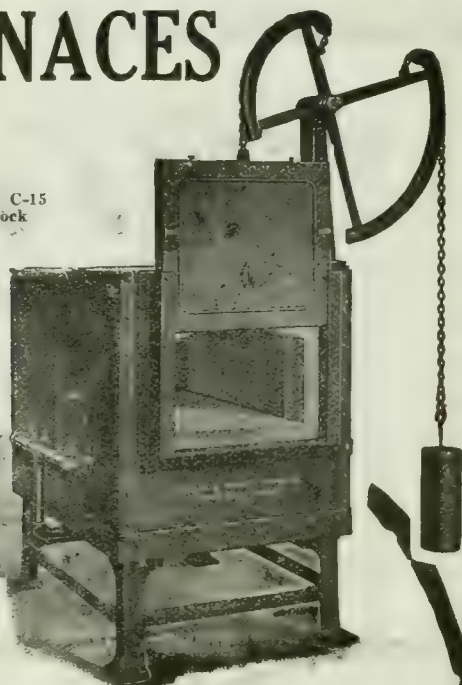
Works:
 WELLAND
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Large Stocks maintained at convenient distributing centres throughout Canada

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GILBERT & BARKER FURNACES

Type C-15
in stock



Shipped on Receipt of Order

If additional proof was required of the efficiency of Gilbert & Barker's heat treating furnaces, this proof was generously supplied during the World War. Industrial plants throughout the United States and Canada engaged on war contracts covering the manufacture of munitions, ordnance, airplanes, motor trucks, tanks, etc., found it necessary to secure on short notice a thoroughly efficient furnace. As designers and builders of heat treating furnaces for a period of more than 50 years it was quite natural that the demand for G & B equipment should be heavy.

You don't have to pay for experience nor do you have to take chances on inefficient heat treating furnaces. G & B furnaces can be depended upon for accuracy and efficiency, plus low operating cost.

There is a G. & B. furnace for every heat treating requirement. Tell us your problem and we will promptly tell you the type of furnace best suited to your needs, but first send for Bulletin 24. Today is a better day than tomorrow—write.

GILBERT & BARKER Manufacturing Company

West Springfield, Mass., U.S.A.

New York Office: 26 Broadway

Canadian Agents:

WILLIAMS & WILSON, LIMITED
Montreal, Que.



STANDARD FURNACES

OIL
or
GAS

*Prompt delivery on all
tool room types.*

For

Annealing
Carbonizing
Hardening
High Speed Steel
Lead and Salt
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*Furnaces built for
special requirement*



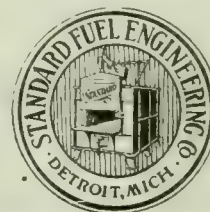
Oil Tempering Furnace

TORONTO OFFICE:

Standard Fuel Engineering Co.

W. H. KIRK, Manager

909 Excelsior Life Building
Phone Main 385



ES&M

ELECTRIC Steel Castings

High Grade STEEL Castings
Of Every Description

Prompt Deliveries

Send us your drawings
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THE ELECTRIC STEEL AND METALS COMPANY, LIMITED

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PERFORMANCE

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Tycos Pyrometers

In them you will find just the character of service you demand. Your requirements can hardly present unfamiliar angles to us; avail yourself of our suggestions, catalogs, information



The Taylor-Cambridge Division

Taylor Instrument Companies

ROCHESTER N.Y.

Tycos Temperature Instruments, Indicating, Recording, Controlling

Electric Welding by Alternating Current

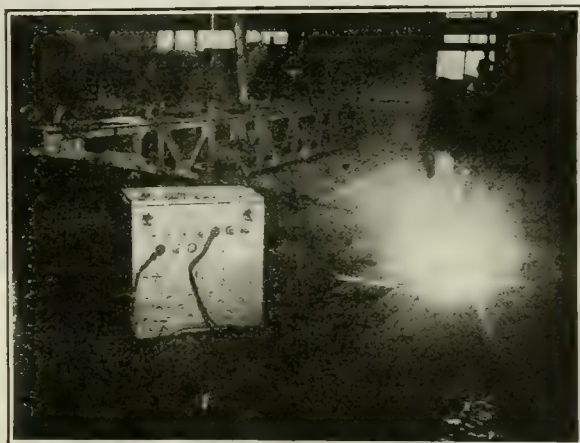
The

“MEPHISTO” WELDER

**Operates on
Alternating Current**

Portable—Highest Efficiency—Lowest Operating Cost. No moving parts, therefore no wearing parts, no upkeep cost.

*Reduces welding costs to minimum
Does not require expert to operate*



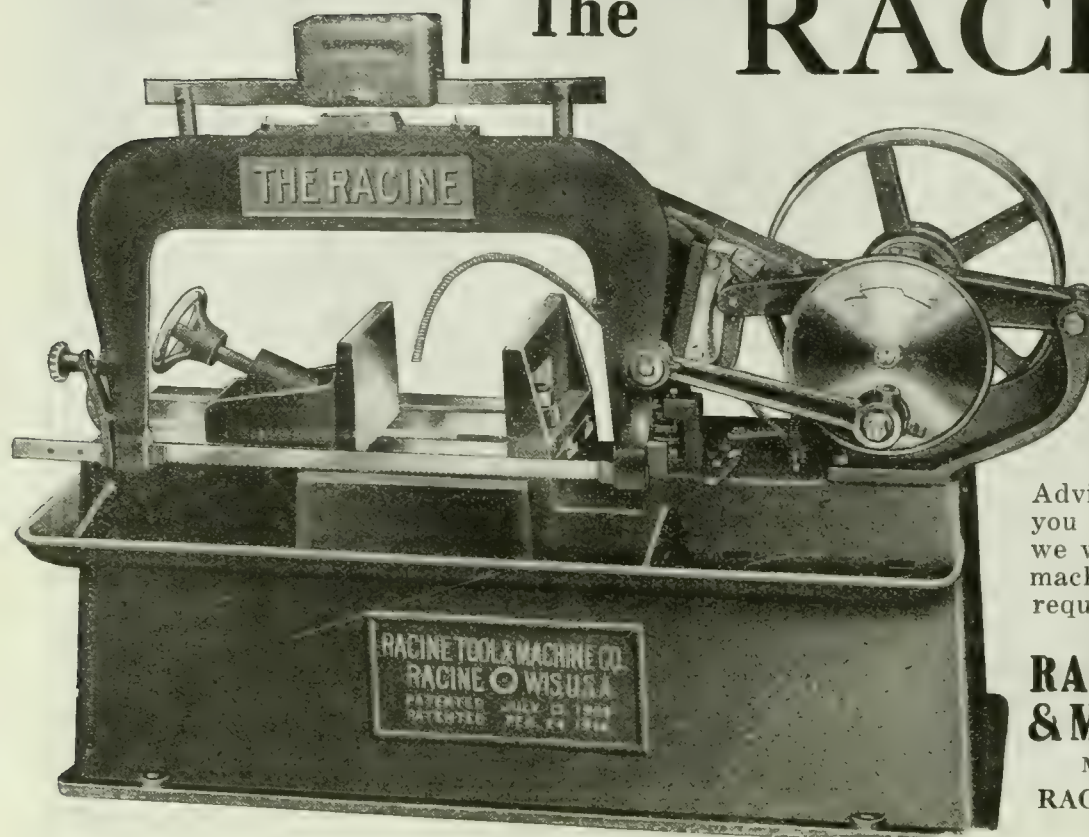
WELDING STEEL PLATE
HAMILTON BRIDGE WORKS, HAMILTON, ONT.

The Arcwell Corporation of Canada, Ltd.

710 C.P.R. Building, Toronto

U.S. Office: 42 Broadway, New York City

The "RACINE"



For Speed
For Accuracy
For Quantity
Production
For Saving in
Blade Costs
For Saving in
Material

Advise us the size stock
you intend cutting and
we will quote you on a
machine suited to your
requirements.

**RACINE TOOL
& MACHINE CO.**

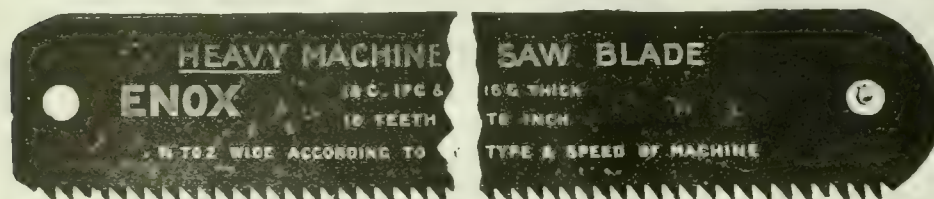
Melbourne Avenue
RACINE, WIS., U.S.A.

SIMONDS

HACK SAW BLADES

UNEQUALED IN QUALITY ANY SIZE OR LENGTH

Simonds Canada Saw Co. Limited
ST. JOHN MONTREAL VANCOUVER



ENOX
Hacksaw Blades

ARE THE BEST

AGENTS IN CANADIAN TOWNS WANTED

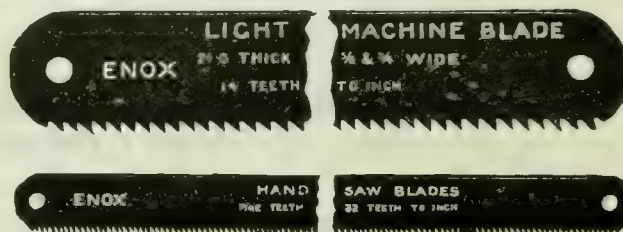
Liberal Terms offered to firms willing to carry
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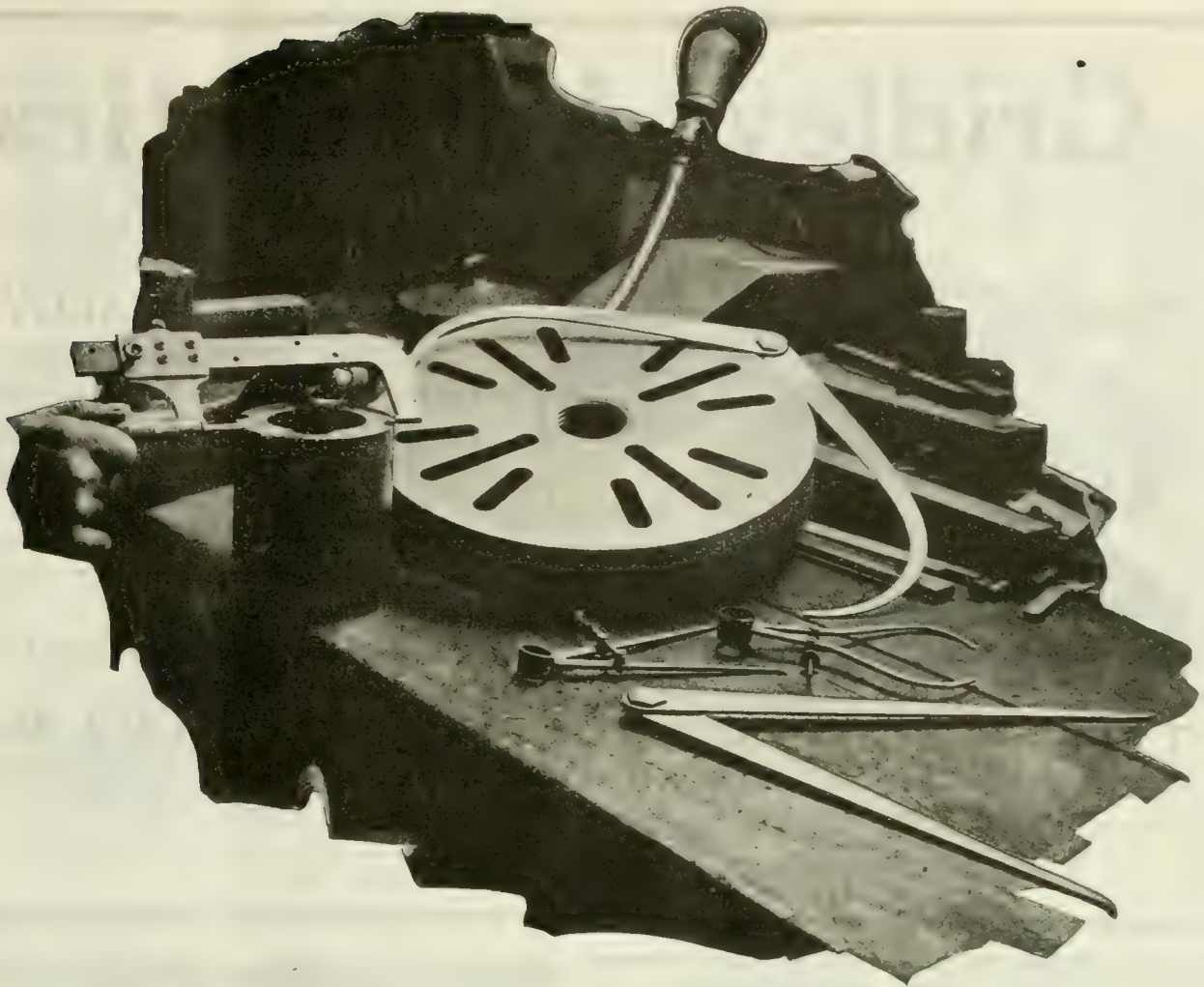
Sole Makers:

FRY'S (LONDON) LIMITED

AN ENTIRELY BRITISH COMPANY

46 Upper Thames Street, London, E.C. 4,
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Not Merely Accurate Tools, but—

tools by which accuracy is determined or, in other words, tools that "check up" the accurate development of other work.

The L. S. Starrett Co. has built its reputation on this issue. That is why Starrett Tools to-day are recognized the world over as standard for accuracy. You can always depend upon Starrett micrometers, calipers, dividers, gages, squares, etc.

Write for our Catalog No. 213

It shows the complete Starrett line of fine precision tools and hack saws.

The L. S. Starrett Company, Athol, Mass.

*The World's Greatest Toolmakers
Mfrs. of Hack Saws Unexcelled.*

New York

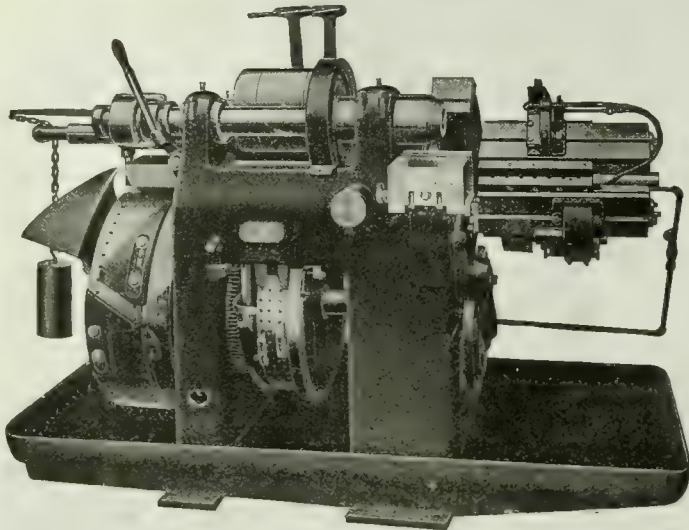
London

Chicago

42-871



Gridley Automatics



For the rapid production of duplicate parts

AUTOMATICALLY

Sizes up to $2\frac{5}{8}$ " diameter made on Gridley Multiple Spindle Machine.

For the larger sizes up to 5" diameter the Gridley Single Spindle Automatic Turret Lathe.

On both, duplicate parts are formed, turned, threaded — rapidly, economically and accurately.

Quotations on your blue prints or samples?

THE NATIONAL ACME COMPANY

General Offices:
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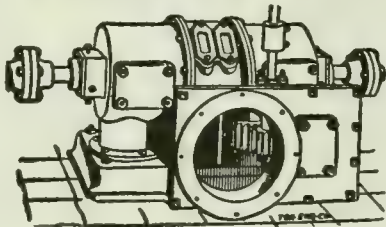
WINDSOR, VERMONT

Canadian Screw Plant
MONTREAL, P.Q.

Branch Offices: New York, Boston, Chicago, Detroit, Atlanta, San Francisco
Warehouses: New York, Chicago. With Foreign Representatives

Makers of Gridley Single and Multiple-Spindle Automatics at Windsor, Vermont, and Acme Automatics, Threading Dies, Collapsing Taps and Screw Machine Products at Cleveland, Ohio

WATER POWER DEVELOPMENT



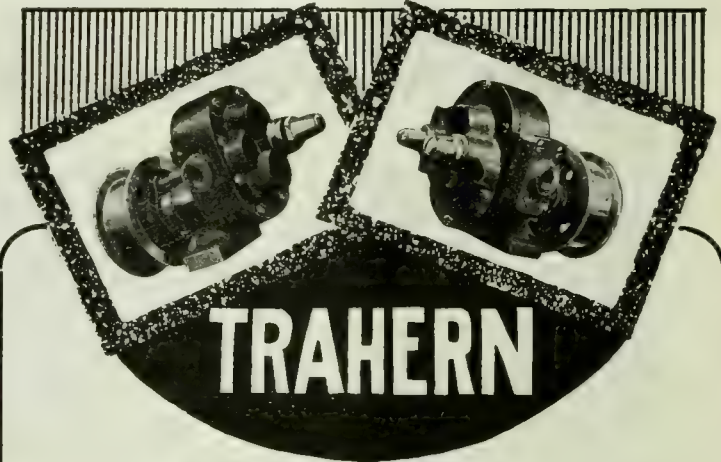
Over forty years' experience in designing and installing special turbines, both on vertical and horizontal shafts.

Can supply complete equipment, including flume, turbine and power transmission.

Stock of standard vertical shaft Little Giant Turbines on hand for prompt shipment.

We solicit your inquiries.

J. C. WILSON & CO.
BELLEVILLE, ONTARIO



ROTARY GEARED PUMPS

The Utmost in Efficiency and Durability

Trahern Positive-drive Rotary-geared Pumps shoot the lubricant into deep bores or other work difficult to cool. Never need to lessen the speed of the cutting tools for the reason that Trahern Pumps, even at slow speed, flood the cutting tool with abundant coolant.

Let us send a sample pump free of charge—to prove that Trahern Geared Pumps are preferable.

Trahern Pump Company

ROCKFORD, ILLINOIS

Canadian Agents:

A. R. Williams Machinery Co., Toronto

Butterfield

Taps, Dies and Reamers

The Deciding Factor in Tool Economy is Quality

Every process in the manufacture of Butterfield Tools is performed by experts, whose entire aim is to produce the highest quality—and the rigid inspection prevents any possibility of inferior tools reaching the shipping room.

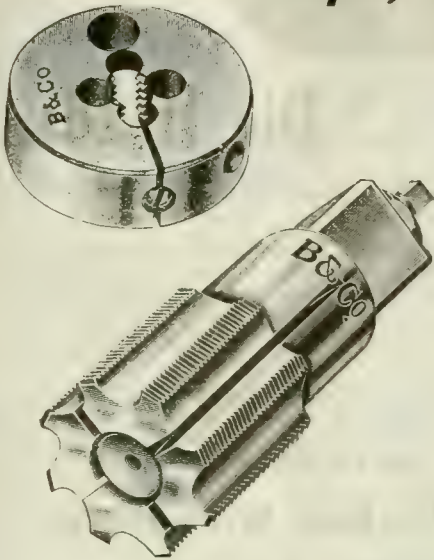
By the service afforded—by the ability to cut cleanly and accurately and to duplicate the work over a long period of use—Butterfield quality gives the maximum returns on your investment.

Butterfield Tools reflect splendidly our 35 years' continuous concentration on improvement in high speed tools. You can't go wrong with a Butterfield.

Send for Catalog No. 17. It's just out.

Butterfield & Co., Inc., Rock Island, P.Q.

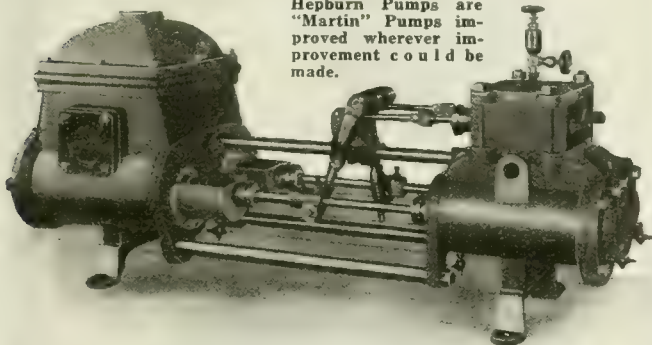
Toronto Office: 220 King St. W.



Hepburn Pumping Machinery

Our line embraces standard duplex pumps for boiler feeding and for fire and general service; tank or low service duplex pumps; duplex hydraulic pumps for service in connection with hydraulic lifts and presses, accumulators and oil presses; pressure or mine pumps; horizontal power pumps and air and circulating pumps, etc.

Hepburn Pumps are "Martin" Pumps improved wherever improvement could be made.

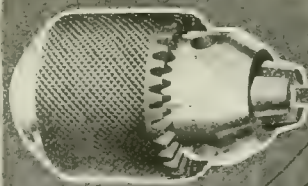


JOHN T. HEPBURN, LIMITED

18-60 Van Horne Street

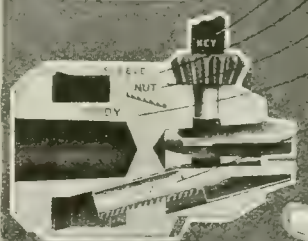
Toronto, Ontario

JACOBS IMPROVED DRILL CHUCK



Gripping Features

Key quickly and firmly tightens jaws.
Toothed sleeve superior to other chucks.
This nut insures accurate operation of the jaws.
Body - Durable - Sturdy - Compact.
The jaw always firmly clamps the tool accurately on center.

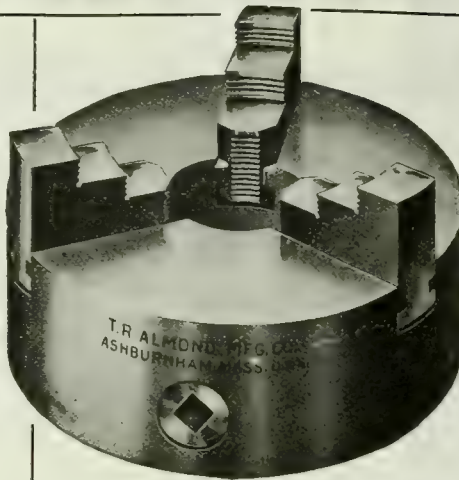


THE JACOBS MFG. CO.
HARTFORD, CONN. U.S.A.

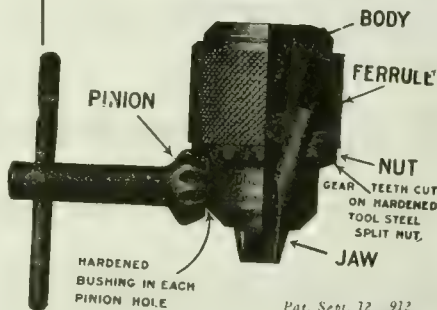


ALMOND CHUCKS & MICROMETERS

Give them
a try out.
Universal
Geared
Scroll
Chuck—
Sizes 5",
6", 7½", 9"
and 12".



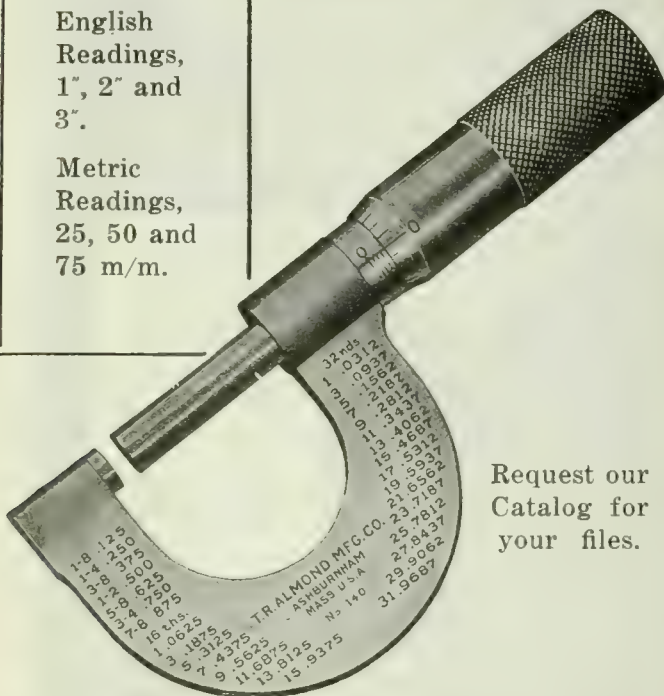
Geared
Nut Drill
Chucks, in
various
capacities,
0" to 1".



Micro-
meter
Calipers—

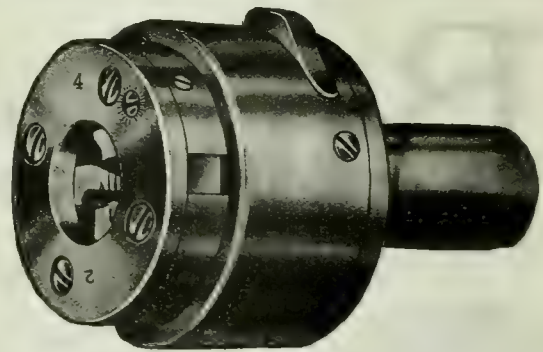
English
Readings,
1", 2" and
3".

Metric
Readings,
25, 50 and
75 m/m.



Request our
Catalog for
your files.

T. R. ALMOND MFG. CO.
6 Maple Avenue, Ashburnham, Mass.



H & G Die Heads

are of small outside diameter compared with the size of work they do.

The H. & G. illustrated is an automatic, self-opening Die Head designed especially for use on Gridley and National Acme Multiple Spindle Screw Machines and others that use the die in a revolving position. The four sizes of this Head cut up to 9 16", 1", 1¼" and 1½".

All parts are hardened and ground and interchangeable. In a word—it's an H. & G.

Ask for Catalog

[Eastern Machine Screw Corp.]

New Haven, Conn., U.S.A.

USHMAN

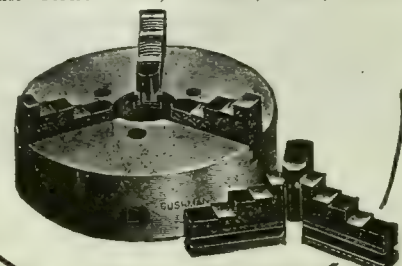
We've been Manufacturing
**Nothing but Chucks
and Their Accessories**

FOR NEARLY 60 YEARS
AND OUR PRODUCTS SHOW IT

Years of experience in using our tools has convinced manufacturers that the word "Cushman" stamped upon a chuck is a guarantee of its quality and efficiency.

Let us send you our catalogue.

Cushman Chuck Co., Hartford, Conn., U.S.A.



Our Six Chaser Model

Our Four-Chaser hand sizing tap made a big "hit" then there came a demand for a six-chaser model. Here it is.



Murchey Machine & Tool Company

75 Porter St., Detroit, Mich.

THE COATS MACHINE TOOL CO.,

Caxton House, Westminster,
London, England, Glasgow,
Newcastle-on-Tyne

FENWICK FRERES & CO.,

15 Rue Fenelon,
Paris, France.

How They Keep Expenses Down

Those six chasers may be ground over and over again, making them as good as new with each grinding.

This gives a distinct advantage to the Murchey Hand Sizing Tap over any solid tap.

Murchey Tools handle threading and tapping operations in one-half the time of ordinary tools. If you want to keep your expenses down and get work out fast, use Murchey Tools.

We make a specialty of quick service—no waiting on chasers

MURCHEY

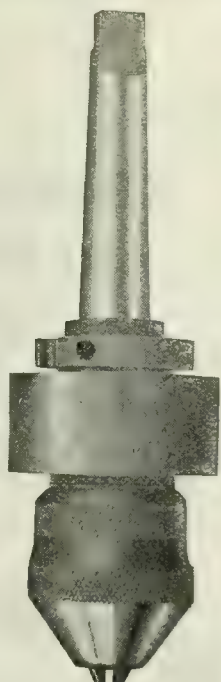
Saves Time and Taps

The Bicknell-Thomas Friction Chuck

Has a grip like a vise, but will release on the instant of over strain. Reduces tap breakage to a minimum.

Small in size. Especially adapted to multiple spindle machines and for use in blind tapping.

The chuck is simple, strong and compact; the adjustable friction drive insures tap safety.



Made in 4 sizes, 1/8" to 1"

BICKNELL-THOMAS COMPANY

GREENFIELD

MASS, U.S.A.

Any Cut a Machine Can Pull or a Tool Stand, the "Knight" Chuck Can Hold

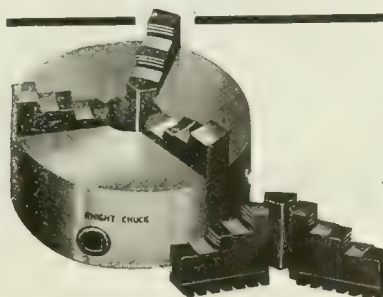
The "Knight" Three-Jaw, Universal Geared Chuck is solidly constructed, its properly proportioned jaws are exceedingly powerful, and the scrolls are very strong.

Characteristics, ease of control, prompt adjustment, adaptability and great gripping power.

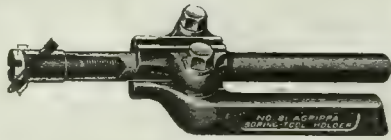
Knight Metal Products, Limited

119 Adelaide Street West

- TORONTO, ONT.



Domestic
and
Export
Trade
Supplied



"Agrippa" Boring Tool takes any size or shape of bar and requires no bushings. Its sleeve bar cap admits a straight or angular cutter; either can be quickly inserted at the business end of the bar without removing the cap or disturbing the setting of either the bar or the holder.

Williams' "Agrippa" Tool Holders

"THE HOLDERS THAT HOLD"

YOU wouldn't use the best automobile produced in the *Nineteenth* Century if you could get it for nothing. You wisely prefer to buy a modern car because of its cheaper maintenance, improved performance and increased convenience.

In the shop you can obtain these same advantages through the *Twentieth* Century improvements of WILLIAMS' "AGRIPPA" TOOL HOLDERS.

Remember, too, that while improved roads have made automobile performance easier, tougher steel, heavier machines and higher speeds have rendered tool holder accomplishment more difficult.

*Machinists' Tools Booklet
on request*

J. H. Williams & Co.

"The Drop-Forging People"

45 Richards Street Brooklyn, N.Y.

The A. G. LOW CO., LTD., 45 Pacific Ave., Saskatoon, Sask.,
Agents for Manitoba, Saskatchewan, British Columbia
and Alberta

"Agrippa" Planing Tool has a serrated ring of improved steel which affords unequalled variety and rapidity of adjustment. The ring is correctly hardened to resist the wear of the cutter. The body of the holder receives a very different heat treatment that prevents breakage.



It's Their Time But It's Your Money

A man with a sharp file will work faster than a man with a dull file; and he'll be more contented and less tired at the end of the day.

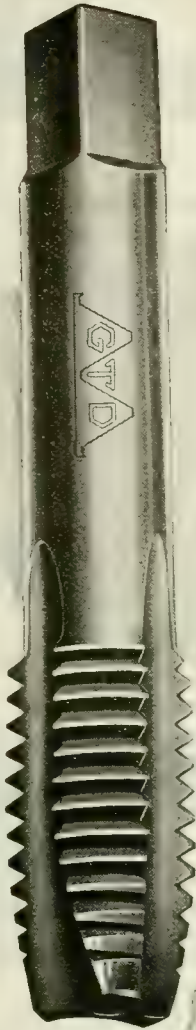
The cost of a new file as a rule is less than one hour's wasted time. You gain, therefore, by telling men to turn in files when they have passed their efficient point. You also gain by ordering Famous Five Files. They give long and efficient service.

Specify them when ordering.

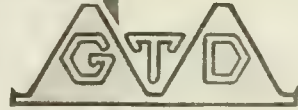
They are :



If any advertisement interests you, tear it out now and place with letters to be answered.



Precision in Threading



Precision in threading can be attained only by the use of precision tools.

The "Gun" Tap

The "Gun" Tap holds all records for accuracy, speed and durability. Its shearing cut requires a minimum of driving power and is self-cleaning—it shoots the chips ahead.

The "Gun" Tap maintains its size and lead in any material.

The Acorn Die

The Acorn Die is capable of a minute adjustment, holds its lead with accuracy, is absolutely rigid while cutting and will outwear a number of ordinary dies.

Nicely illustrated booklets describing the "Gun" Tap and the Acorn Die will be sent on request. Also new No. 40 Small Tools Catalog.

Wells Brothers Company
of Canada, Limited

GALT, ONTARIO

Canadian factory of the
Greenfield Tap and Die Corporation



The Only Grand Prize for TOOL HOLDERS

Awarded separately and independent of other
lines exhibited at the

PANAMA-PACIFIC EXPOSITION

WAS WON BY

ARMSTRONG TOOL HOLDERS



HIGHEST AWARD

at 4 World's Exposition

Paris - - - 1901
St. Louis - - 1904
Liege - - - 1905
San Francisco 1905

THEY ALWAYS
MAKE GOOD



They Are Saving Millions of
Dollars in High Speed Steel

CATALOG FREE

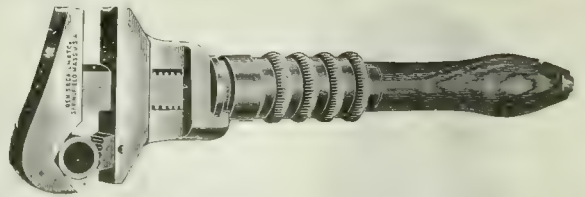


Armstrong Bros. Tool Co.

"The Tool Holder People"

306 N. Francisco Ave., CHICAGO, U.S.A.

The Panama-Pacific MEDAL OF HONOR was also won by
ARMSTRONG Drop Forged Wrenches, Ratchets,
Clamps, Lathe Dogs, Etc.



USE B. & C. WRENCHES

At the top is a combination
nut and pipe wrench, with head,
bar and shank, a one-piece
forging of great strength. The
lower illustration shows our ad-
justable "S" wrench, whose slid-
ing jaw is a steel drop forging.
All parts of each wrench are
interchangeable.

Write For Catalogue

**BEMIS & CALL
HARDWARE & TOOL CO.**
SPRINGFIELD, MASS. - - U.S.A.



Forgings and Steel Stampings

OUR Forge Plant compares very favor-
ably in size with any on the Contin-
ent. Its efficiency is equal to that of
any, and exceeds most. We can handle
effectively practically any drop forging.

OUR Stamping Plants contain over 100
presses, including equipment to
handle heaviest drawn work.

Dominion Forge & Stamping Co., Ltd.

WALKERVILLE, ONTARIO

Toronto Office: 510 Lumden Building

This Letter
is from one of the largest
Automobile Plants in America

Davidson Tool Mfg. Corp.,
118-20 Maiden Lane,
New York City.

Gentlemen:

In reply to your request for a report on the formed milling cutters delivered to us on November 15th, we desire to state that these were the most satisfactory tools of this description we ever have used.

The work was on cast steel and consisted of milling spanner wrenches for Battery Reels. The speed was increased to the limit of the machine but the cutters were not effected. In fact we were unable to push them to the limit they will apparently stand. We laid out four sets of cutters to do this work, but the Davidson cutters did it all without grinding. They are still in first class condition.

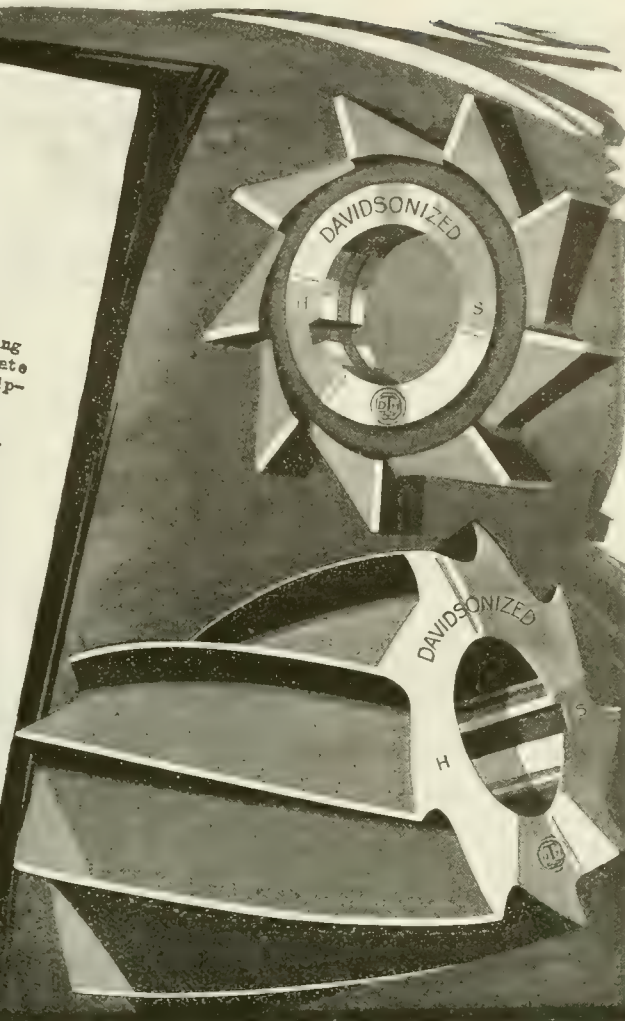
This performance was all the more interesting to the writer because this company has had experience with tools furnished by other concerns who claim to be able to cast high speed steel and the results have been uniformly unsatisfactory.

We may state that after adding our cost in finishing up your cutters which were furnished in the semi-finished form, to your charge, we were still 25% lower than it is possible to buy similar cutters elsewhere under present conditions.

Early in January we will begin active preparation for increased passenger car production and will then be in a position to give you business merited by the performance of your tools.

Very truly yours,

(NAME ON REQUEST)



Cold Facts Convince Them All

300% Better Performance; 25% Saving in Tool Cost

Such a performance is beyond our guarantee and cannot be expected in every case. Yet we continually receive reports of similar remarkable records by

DAVIDSONIZED High Speed Steel Tools

The biggest plants in the country are providing proof after proof of the increased production, longer service and tool-making economy which this remarkably advanced steel makes possible.

We guarantee any tool of Davidsonized High Speed Steel to give you at least 10% better service than any other tool you have been using on corresponding work. You will be the sole judge.

Such an increase, figuring factory overhead and labor, multiplies several times over the value of the tools.

Note our "Special Service" feature. It applies to standard tools, but is especially desirable for tools made to unusual shapes and other specifications.

Davidson "Special Service" costs you less than to bring your tools from the bar to the stage at which we furnish them. It eliminates loss by cracking in hardening. And it gives you **better** tools than you are now using, tools that increase production and last longer. Send us a trial order; you run no risk; our guarantee assures that. Correspondence invited.

SPECIAL SERVICE

We will supply Davidsonized Tools, semi-finished and easier to machine than any carbon tool steel, within approximately 1/64 of finish on face, 1/64 in bore and 1/32 in diameter, leaving only the final hardening and sharpening to be done in your tool room. A tool that takes 20 hours to make from the solid bar can easily be finished from a Davidsonized blank in about two hours. And we will guarantee our tools against breakage in hardening.

THE DAVIDSON TOOL MFG. CORPORATION

Main Office: 118-122 Maiden Lane, New York

Works: 56-62 North 6th St., Brooklyn, N.Y.

THE CANADIAN FAIRBANKS-MORSE CO., LIMITED

Halifax, St. John, Quebec, Montreal, Ottawa, Toronto, Hamilton, Windsor, Winnipeg, Saskatoon, Vancouver, Victoria

Notes on Grinding

NORTON COMPANY,
WORCESTER, MASS.

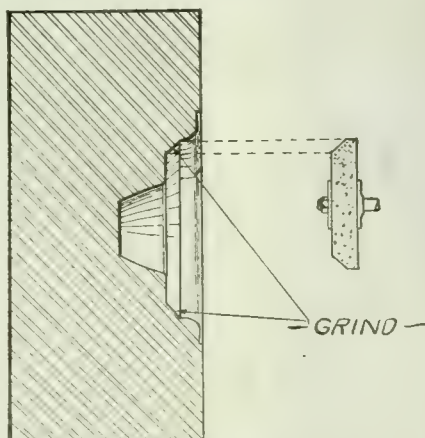
No. 24A

Form Die Grinding

Grooving and form grinding usually consist of clearing out the grooves after the rough shaping has been completed and the dies have been hardened.

The wheels used are very thin and hard and are made with a rubber or elastic bond to avoid breakage. After a groove has been cut to approximately the right depth, special faces are put on the wheels by using a diamond or a piece of abrasive brick or broken wheel, preferably made of a silicon carbide abrasive. The wheel is then fed into the groove and cleans it out to the desired shape.

Form grinding is often done on internal or semi-internal operations where a groove is desired at the face of circular dies. The sketch shows a typical example of a striking, or final operation, die used in the manufacture of housings to cover moving parts on a small machine. The points ground are indicated by arrows. The wheel was dressed to the proper face with a piece of broken wheel. The die was revolved in a chuck and the wheel fed direct into the sides of the die. This operation saved considerable hand scraping and left the die ready for polishing. The wheel used was an Alundum wheel, grain size 70, grade N, and was done on a lathe equipped with a portable electric grinder.

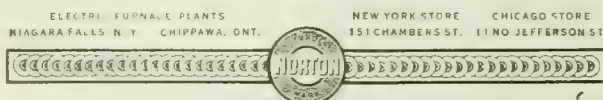


Form grinding circular striking die—die revolved in chuck.

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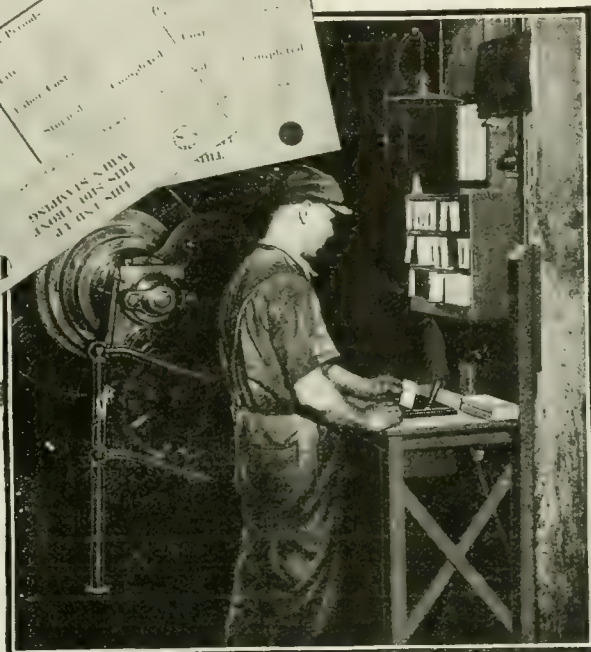
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NO 145
Job No. 387
Part No. 96
Name: [Signature]
Operation: Drill
Date: 2 MAY 1918
Time: 108 : 8
Total Periods: 100 : 8

NO 145
Job No. 392
Part No. 154
Name: [Signature]
Operation: [Blank]
Date: 2 MAY 1918
Time: 120 : 12
Total Periods: 108 : 12

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CANADIAN MACHINERY AND MANUFACTURING NEWS

Volume XXI. No. 5.

January 30, 1919

Making Milling and Gear Cutting Attachment—III

In This Article is Described the Making of an Attachment For Lathes Which Performs Milling and Gear Cutting Operations—Various Tools and Operations Used in Machining Are Shown

By ROBERT MAWSON

IN this part of the article are shown the tools and methods followed when machining the vertical slide column base, dividing head, index bearing, and plates.

These, as well as the other tools shown in the series, are designed so that the first surfaces machined are used as the locating medium, thus ensuring interchangeability and reducing to a minimum any chance of error.

Two of the tools are worth particular attention, the first being a counterboring fixture, which employs an index line on the boring bar and pointer carried in the tool post to obtain duplication.

The second is a multiple jig, which is used for the various index plates, a pawl with separate spacing wheels being utilized for each different plate.

On the "Star" milling and gear-cutting attachment, which is manufactured by the Presto Machine Co., Inc., Brooklyn, N.Y., it will be seen (by referring to the first section of these articles) that the vertical slide column has a graduated base, which can be set to any angle within its range when milling such

parts as bevel cutters, gears, taper reamers, etc.

The first operation when machining the base is milling, and is shown in Fig. 1.

The fixture is designed to hold two castings, which rest on pins and are located against stops A, being forced against them with the screws B. Four clamps, as shown, hold the castings securely in the fixture, which is located by tongues on the milling machine table.

The vee-shaped dovetails are then machined to a gauge to ensure the correct width and angles of 30 degrees.

After these surfaces have been milled the machine table is lowered, the correct amount determined by the graduations on its spindle, and the end of the same cutter used to machine the base of the castings. The dovetail surfaces are next scraped to a gage to ensure the correct shape and width.

The milled base is then placed in the fixture shown in Fig. 2 for the next operation. The casting is located by its dovetail surfaces, which fit accurately on machined registers and is pushed against

a stop at the rear with the screw A.

The three screws shown, two on one side and the other on the opposite side, are then tightened against the piece to hold it securely against the machining stresses.

The end of the projecting surface is then faced, the boss turned to 1.374 in., a hole bored to 0.4375 in. and countersunk, also the lower surface faced and bevelled with an angle of 60 deg. in a manner similar to that described when machining the dividing head base.

The bevelled surface is then graduated, using the same machine as previously described and a set of graduations obtained.

These graduations are then stamped, the only difference between this and the dividing head base being that on this part the marking starts on a centre line between the vees with zero and reaches 90 degrees on each side, not being marked all the way around. The graduations are then polished to remove the burrs.

In Fig. 3, at the right, is shown one of the vertical slide column bases as re-

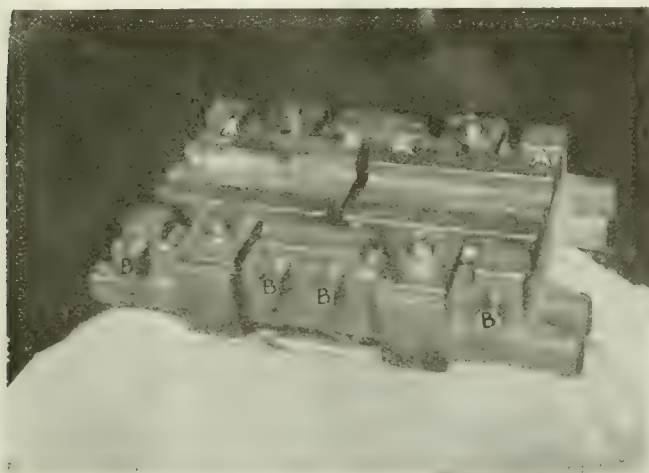


FIG. 1 MILLING BASE AND VEES.



FIG. 2 FACING, TURNING, BORING AND COUNTERBORING.

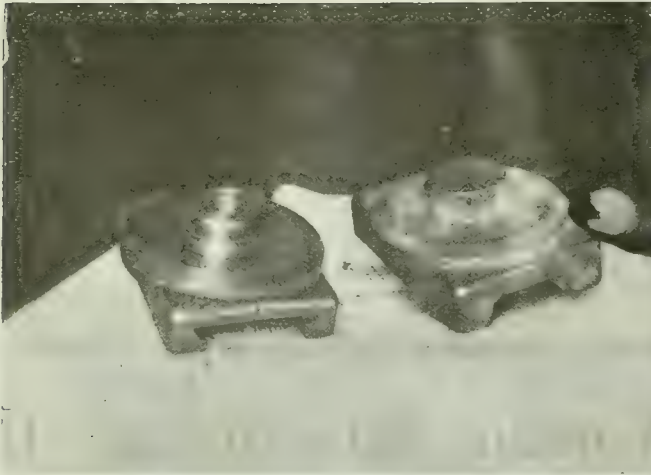


FIG. 13 A ROUGH AND FINISHED BASE.

ceived from the foundry, and at the left may be seen one after being machined.

The method of graduations used so that the base may be swung 90 deg. each side of a centre line and its angle determined will be observed.

Machining the Dividing Head

The dividing head is the element which holds the part being machined and is attached to the vertical column by means of the base last described.

One of the castings before machining is shown in Fig. 4.

The fixture used for the first operation is shown in Fig. 5.

The casting is located with the bevelled stop A and bevel at B, the piece being forced against these two locations with the screws C in the swinging cover.

This cover is swung back out of the way when inserting the casting in the fixture.

The hole D is then bored out to 1.375 in., using a plug gauge for testing.

The fixture is made with a revolving sub base E and a pin at the rear (shown in Fig. 6) with two bushings for location.

After the first hole has been machined the clamps F are loosened and the index pin being removed the sub base is swung around on the fixture base to its next location, determined by the second index bushing.

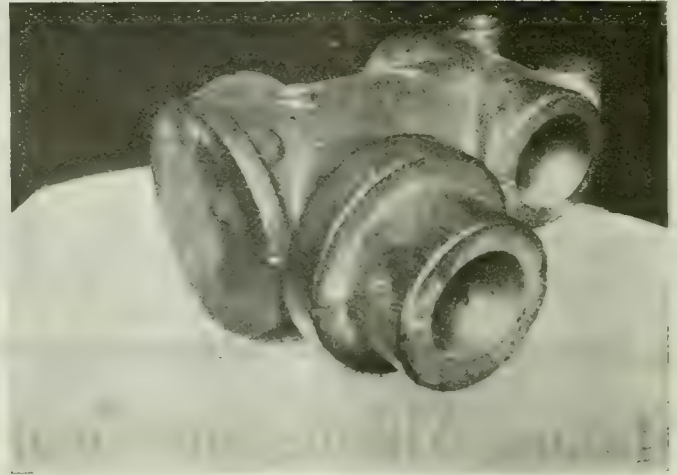


FIG. 4 DIVIDING HEAD IN THE ROUGH.

The clamps are then again tightened to hold the sub base firmly on the base.

In this new position the boss G has been brought to the centre line of the fixture ready for machining.

The hole in this boss is then bored to 1.375 in., the edge faced and the boss turned to 2.001 inches.

It will be observed that the fixture is provided with a counterbalance to obtain smooth running when machining the piece.

A view of the other side of the fixture is shown in Fig. 6 and the vee surfaces used for locating the casting, also index pin, can be seen to better advantage.

The next operation is facing the base, which is performed in the fixture, Fig. 7.

For this purpose the casting is placed on two turned arbors, which fit into the 1.375 in. bored holes.

The cover A of the fixture is taken off and the casting placed in position, the two arbors fitting in vee blocks as shown.

The machined edge of the piece is located against the surfaces B of the fixture.

The nuts C hold the arbors securely and the set-screw D assists in holding the casting in the fixture.

The duty of the last feature, however, is very slight, as the holes are bored accurately and the arbors are made a good sliding fit, the only purpose of the

screw, therefore, being to prevent the casting sliding away from the location B.

The base D is then faced and the outside of the boss turned.

The casting is then placed on two pins in the fixture, Fig. 8, for the next operation, which is milling a Woodruff keyway.

The open washer A and nut provides a quick setting of the piece and the fixture needs no further explanation.

The various holes are next drilled and tapped for 5-16 in. x 18 threads, no jig being used, the holes being spotted in the centre of the bosses.

Machining the slot for the binder bolts follows, the casting being located on two pins in a similar fixture to that last illustrated, the slitting saw used being 1-16 in. thick.

The edge of the turned surface, which was machined in the first operation, is then graduated and stamped, using the special machine previously described.

The purpose of these graduations is to facilitate quick and accurate adjustment to any desired hole when using the attachment.

An oil groove and straight keyway are next machined, but no special fixture is used for the work.

One of the dividing heads, after it has been completely machined, is shown in Fig. 9, and the result of the opera-



FIG. 5 BORING, FACING AND TURNING.

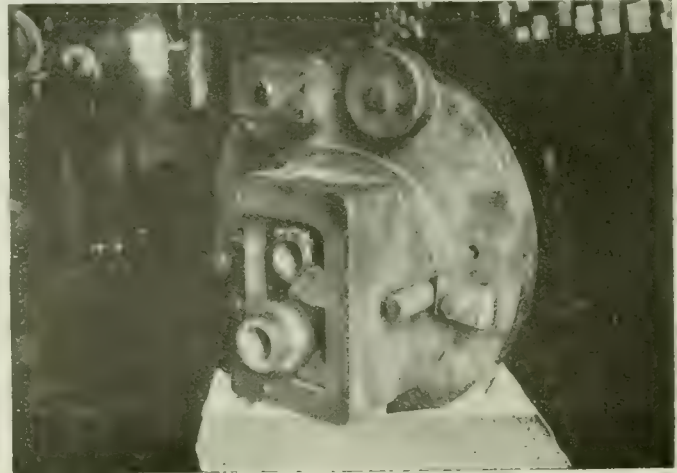


FIG. 6—ANOTHER VIEW OF FIRST TURNING OPERATION.

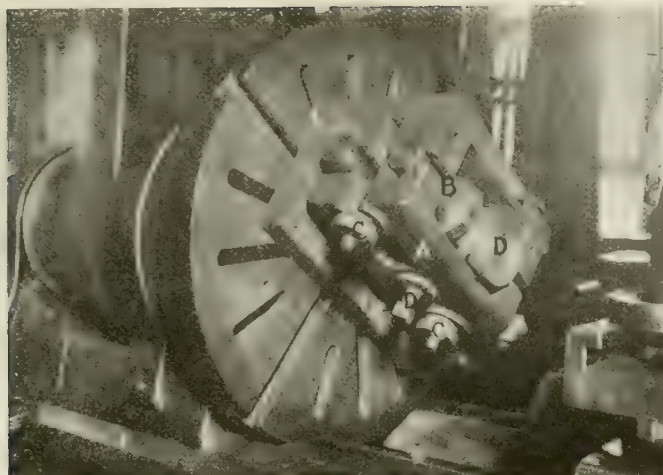


FIG. 7—FACING THE BASE.

tions of varying character can be observed.

Machining the Index Bearing

The index bearing is the member which fits on the turned part of the dividing head. One of the rough castings is shown in Fig. 10. The first operation when machining this part is a

centre in the tail stock of the lathe.

A hole is then drilled and reamed to 0.5625 in. through the entire length of the casting.

To perform this a special long drill is used, the drill being held and driven by the lathe chuck and the casting held on a centre in the lathe tail stock.

manner similar to that obtained when drilling.

The head end of the casting is then counterbored to 0.85 in. to a depth of 1½ inches.

The casting is next placed on an arbor and the opposite end turned to 1.374 in. and the boss faced.



FIG. 8—MILLING THE KEYWAY.



FIG. 9—A FINISH MACHINED DIVIDING HEAD.

rather interesting lathe job. The casting is just laid off and spotted at A.

The piece is then held in a steady rest, and the centre already made being carried on the live centre of the lathe. A centre is machined at B with a square

The hole is drilled half-way through the piece, which is then turned end for end and the rest of the hole machined in a similar manner.

By this means a straight hole is obtained. The hole is then reamed in a

The casting is then placed in the fixture, Fig. 11, for the next operation, which is boring and counterboring.

A rather interesting method is used for locating the piece for this work.

The casting is placed in a vee block,

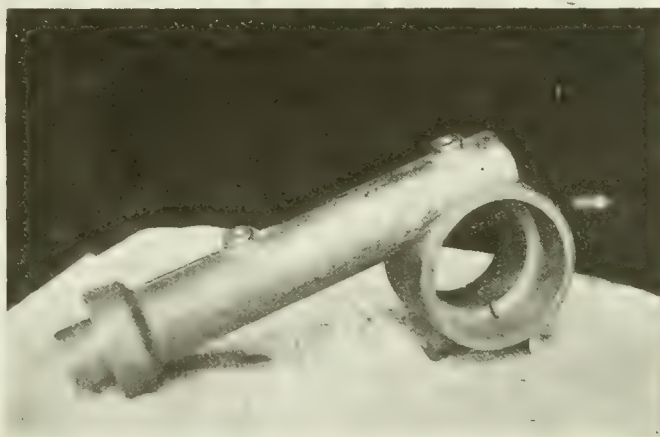


FIG. 10—ROUGH CASTING, INDEX BEARING.



FIG. 11 BORING AND COUNTERBORING.



FIG. 12—ANOTHER VIEW OF FIXTURE.

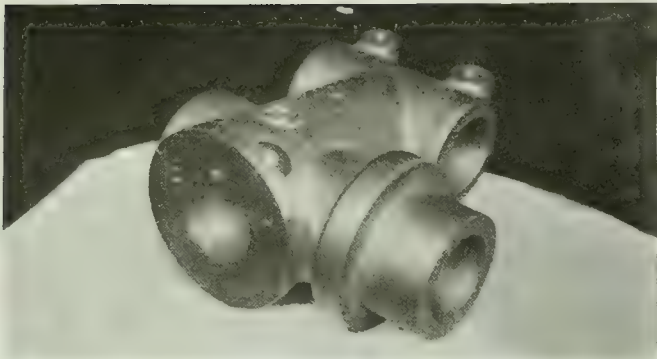


FIG. 13 DRILLING FOR CLAMP BOLTS.

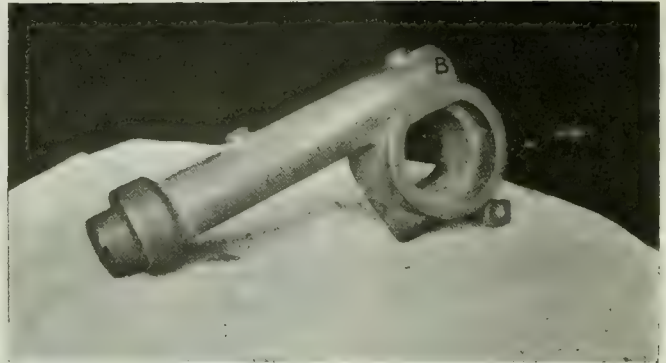


FIG. 10-ROUGH CASTING INDEX BEARING.

which is made to suit the turned shoulder.

The large boss is located by a swinging block, which is also made in the form of a vee.

The illustration, Fig. 12, shows these details to better advantage. A is the vee locating the turned surface, and B the swing plate used to locate the large boss.

The two screws C are tightened against the ears at the large end to assist in holding the piece.

The clamp B is also made with a bevelled edge, so that it not only locates the casting, but when tightened down tends to hold the same.

A 2.000 in. hole is then bored in the large boss with a tool in the bar, Fig. 11-A.

This bar, however, performs a double duty, as it carries also a counterboring tool to machine to 2.4375 inches. After the hole has been bored to 2.000 the feed of the bar is continued and the larger tool in the bar counterbores to the other size given.

The depth of the counterbore desired is 0.875 in., and as it would be a slow and, at best, an unsatisfactory job to have to keep measuring this depth, the method here described is followed.

On the surface of the bar at B is inscribed an index line.

The operator therefore feeds in the bar until the pointer C coincides with this index line, and after the pointer has been once accurately set the machining of this counterbore to the correct depth is one of quick duplication.

Two holes are then drilled as the next operation for oil holes, these being spotted in the centre of the bosses.

The jig shown in Fig. 13 is then placed on the casting, being located by a plug at A and fitting over the turned boss at B.

The jig is held with a screw C at the upper end.

This tool is made of sheet steel and as the plug is only of a relatively short length it can be sprung into position with the upper position fitting on the turned shoulder.

Two holes are then drilled for 5-16 in. x 18 thds. through the bushings C, these holes being used to attach the index plates onto the tail stock.

A slot 1-16 in. wide is then machined for stamping the tail stock on the dividing head.

An oil groove is also machined through the long hole, using a one point cutter held in a bar and employing an arbor press to force the bar through the

piece: A finish machined index bearing is illustrated in Fig. 14.

Machining Index Plates

The index plate fits on the outer end of the index bearing and is the medium used for spacing the object being machined into any number of desired divisions. The first operation when making them is to bore and face one side, holding it in a chuck on the lathe.

The index plate is then reversed, being held on a face plate and the other side faced parallel to the first, the operation being again performed in a lathe.

They are next placed on an arbor, 20 at once, being located by the bored hole and the outside turned to the correct diameter.

A simple jig is then used, locating from the bored hole, and two holes drilled to suit those which were machined in the index bearing.

The index plate is next placed in the jig, Fig. 15, being held on the pin A and located by the two holes drilled in the preceding operation.

The index holes are drilled with this jig, the drill being guided through the bushings in the clamp cover B, which also holds down the plate.

Some of the interesting features of this jig are worth noting.

It will be seen that the tool is designed to suit nine index plates with different numbers of rows of holes.

To suit these various conditions the index finger C is set to suit the one being drilled.

This index controls the pawl which fits into the spacing wheel shown.

Bushings in the clamp cover are also marked with the same number as the index dial.

In operation, therefore, taking the one shown, which is No. 3, the man simply moves the plate around to the various spaces determined by the notches in the spacing wheel and feeds the drill through the bushings marked No. 3.

The advantage of such a tool is apparent, as it is easily set and operated; also is designed to take care of the full range of work desired.

It is further positive in its action, the pawl fitting into the spacing wheel, insuring the man of its accuracy.

The index plates are afterwards stamped with the correct numbers, polished and buffed.



FIG. 15--DRILLING INDEX PLATES.

CANADA IS ENTERING THE FIELD OF INDUSTRIAL RESEARCH

NEWSPAPERMEN have a saying that every man has at least one good story tucked away about him somewhere. Every man, also, probably has a message, if opportunity would present itself to deliver him of it. The outstanding message which King George, for example, had, was the one he delivered to Great Britain when he returned from his world circling tour as Duke of York, and, at a banquet in the Guildhall in London, told his people to "Wake up" to the opportunities for commercial expansion in which they had long been leaders, but which he feared they were neglecting. King George saw, as so many others who went abroad in the world could not help but see, that Germany was reaching out for control of the world's commerce, and was securing it as a result of the application of science to industry, and the fact that Germans everywhere were distinguished by an intense earnestness in the pursuit of science as applied to trade which was lacking in the other nations.

Let me give an instance of this, the personal character of which may perhaps be excused because it is so much in point. Some years ago the writer was in the laboratory of the Imperial Government science department of one of the West India Islands securing information regarding certain experiments which were being made with different sugar cones. There were three young scientists, two Englishmen and a German in the laboratory. The Englishmen were delightful young fellows, as talkative and full of life as the German was unattractive and reserved. Presently a bevy of pretty American girls from a calling steamer, who had made the acquaintance of all three of the young men, descended on the place, and, in short order, some pleasant excursion was arranged. The Englishmen were game for anything, and an effort was made to include the German in the party. He was full of regrets and apologies, but he "was engaged in a most interesting eggshering," which he would not leave even for the delights of rare female companionship. His companions had their picnic, and I suppose the German dug out and stored away the particular piece of scientific information about the sugar business he was after.

That incident illustrates the mental attitude of the two races such as it was before the war. The Briton, including the Canadian, left this sort of thing largely to the Teuton, with the result that Germany was admittedly securing almost a monopoly of trade secrets, and what she did not discover she calmly appropriated and perfected. The production of dyes from coal tar, for example, was discovered by the Englishman Perkins, but it was not long before Germany had so completely appropriated the discovery that the dye industry of the world had been monopolized by her, and when war broke out Great Bri-

tain and the United States had to get to work and learn the processes for themselves. They had been content to allow the German to appropriate to himself the position of scientific beast of burden for the world, ignoring the fact that the time might come when he would run away with his load of knowledge.

This question of the application of scientific research to industry is one to which the war has awakened the world. It is one of the numerous methods by which Germany, if her mad junker class had left things alone, might have accomplished that conquest of the world which she so lamentably failed to bring about by force of arms. It is one of the things to which the world now unanimously says: "Never again." England, in common with other nations, has at length listened to King George's appeal to "Wake up."

How she is doing this, and how Canada proposes to take part in the game, is a question of vital interest to our manufacturers. In Canada the work is being directed by the Council for Scientific and Industrial Research, working in conjunction with the Reconstruction and Development Committee of the Cabinet. It is proposed, as announced some months ago, that there shall be created a Central Research Institute for Canada, the Government of which shall be vested in the Council, and having associated with its administration the Canadian technical societies, the universities, and representatives from the manufacturing and labor organizations. All these interests are working harmoniously together to this end.

Britain Now Awake

In Great Britain the work was undertaken some time ago. Early in the war she "woke up." A department of research was established, a five-year programme laid out, and a vote of one million dollars a year made to carry it through. The method adopted there, which will likely be followed in Canada, was the formation of trade groups, or guilds, to conduct that work of particular significance to each of them. Every line of industry has, or will have, one of these guilds and new researches under the supervision of the British Research Council are constantly being conducted. Two members of the Canadian Council, Prof. McLellan of Toronto University, and Prof. Adams of McGill, are now in Great Britain observing and reporting on what is being done.

Science and Fisheries

As this is a typical instance of what research means for the manufacturer, it will be interesting to consider just how the fish canning and fishing industries may be helped by applying science to their problems. It is estimated that from five to ten per cent. of the annual lobster and sardine output of the Maritime Provinces goes to waste through

spoiling, due to such causes as discoloration, bacteriological deterioration, and so forth. Science will be called on to study and remove the causes. Then, the Research Council estimates that, through the fish offal and non-marketed fish wasted on the Atlantic and Pacific coasts, about six million dollars' worth of fish oil, and enormous quantities of fertilizer and stock and poultry feed, is thrown on the national waste heap. The value of these substances is known. In many of the districts in the Maritime Provinces, where fishing and farming are combined, fish and fish offal is spread on the land, and is found an excellent fertilizer, even in its raw state.

The Alcohol Project

Take another instance: denatured alcohol. Here we have a chance to not only establish a new industry and give subsidiary aid to a score of others, but might, at the same time, help to solve the problem of utilizing the abandoned distilleries of Canada. As a result of a conference between the Research Council and the Government, it is probable that legislation will be passed removing the excise duty and restrictions on the making of denatured, or industrial, alcohol. The uses to which this substance can be put are legion. Canada has about settled forever that the use of alcohol as a stimulant in Canada must cease; and it would be a fine revenge, which even the most rabid prohibitionist would appreciate, if it were to have its sting removed and be applied to the stimulation and exhilaration of trade. The Research Council can show you a list of fifty or more commercial products, ranging from felt hats to fire-works, to the manufacture of which alcohol can be applied, and dozens of processes where its use is necessary. Even in the small way in which we were using it commercially before the war, nearly a million gallons a year were required, every drop of which we could produce from waste products in two or three of our many pulp mills, by the installation of recovery apparatus involving a trifling expense. All that is necessary is to remove certain restrictions.

The chief aids asked for are the removal of the excise duty, and permission for the denaturing of alcohol in the most convenient and inexpensive way possible. At present all alcohol has to be sent to Ottawa to be denatured before it is allowed to be sold for industrial purposes, involving double transportation charges. It now costs about a dollar a gallon in Canada, as compared with fifty cents in the United States. It is believed it can be produced here under unhampered conditions at less than forty cents a gallon. And it can be made non-potable (or unfit for use as a beverage) without detracting from its value for commercial purposes.

Coal of the Prairies

Take another instance of more immediate and particular value to the prairie provinces. The Research Council estimates that there are in Saskatchewan alone fifty-seven billion tons of lignite coal. The areas, which occur in the

PASSING OF THE SMALL FOUNDRY

Laramie formation, have been worked in a small way at Estevan, Rouleau, Bienfait, and other points in the southern portion of the province for a good many years. Some years ago thirty different mines were in operation, with a total production of about two hundred thousand tons annually, largely consumed locally, where, although of inferior quality in its "raw" state, it helped out where fuel of any kind is hard to get. The Research Council has made an arrangement with the Federal Government and the Governments of Manitoba and Saskatchewan for the establishment of a demonstration plant at a cost of about \$400,000 for the production of carbonized and briquetted coal from these lignites. An exhaustive study of the subject will be made; and it is confidently expected that ultimately the West will supply all its own fuel for heating, lighting and power purposes. This will give the West cheaper coal, will save millions now paid for American anthracite, and will prevent shortage of the anthracite supply in the East.

Such instances as those quoted will show that Canada is thoroughly aroused to the problem. For its solution, she needs men and money. We have almost a virgin field to work in this matter of industrial scientific research. The United States have done a little better than we have. There are two institutions there, the Bureau of Industrial Standards at Washington and the Mellon Institute at Pittsburgh, which have done great work; all the big universities have faculties of applied science, and there are several well-known institutes of technology. Over fifty industrial concerns have well equipped private research laboratories. Private firms have research workers at the different institutions, and at the Mellon Institute the other day a bakery concern discovered a process for the prevention of loss from evaporation in baking, which it is estimated will save this company a million dollars a year. Another recent instance is that of a research worker at Columbia University, who discovered a new "wrinkle" in cold storage which may revolutionize that industry.

Need for Trained Men

In Canada our output of men qualified for research work equals less than five per cent. of the demand. Less than two per cent. of our industrial concerns have facilities for research work. The few research men we have been producing have been quickly picked up by our neighbors. The only Canadian universities which have given the subject any serious consideration are Toronto and McGill. The Research Council, therefore, proposes to the Canadian universities that they shall take hold of the matter seriously, and to this end studentship and fellowship will be established to be awarded annually to science graduates in connection with some specified research. As soon as facilities are available at the different universities there should be hundreds of young men preparing to take up for Canada a portion of the work which Germany relinquished by her own foolish act.—T.M.F. in "Financial Post."

WHEN I say "passing," I take into account the fact which confronts me whenever I visit a small town, that somewhere within its boundaries there stands what was once a foundry, but which may now be only a ruin. In years gone by every town or village, no matter how small, had its foundry, and it was no uncommon sight to see two or even more foundries in a town with less than one thousand inhabitants, and I have seen the somewhat amusing spectacle of a village with about three hundred of a population supporting two fairly good foundries, each having a machine shop in connection and each proprietor being a machinist and, of course, managing his own machine shop, and then between the two of them they would engage a molder to work alternate weeks in each foundry. From this it will be understood that the molder would go into one foundry on Monday morning and cut up his sand and begin his week's work by sorting over the jobs laid out for him and making up what cores he would require and dry them in the smoke box of the boiler, or some such an improvised core oven. This would probably consume about all day Monday. On Tuesday he would start molding and continue this until Friday night, and then on Saturday morning he would be in shape to pour off.

Saturday afternoon would be devoted to shaking out and getting his castings in shape to be delivered, and also to wetting down his sand for next time. On the following Monday morning the same procedure would be in order in the other foundry. It was an interesting programme which this molder would have to go through in these little shops. A tin-pail kettle would be in the first mold; after this would be some plow work, such as land sides and mold boards, etc., and also innumerable bits of job work of every conceivable variety. Friday, the last day of molding, would be reserved for the chilled plow shares. These would be left open over night, so that the chills would not draw dampness and become rusty. These foundries always seemed to hold their own, but still, it is quite reasonable to expect, that their "modus operandi" would not stand the test at this late date. However, if managed under modern methods, there is nothing to prevent them from being valuable assets even now. Now, Mr Reader, I served my time in a foundry which, while not so small, was run on similar lines. All foundries were run the same in those days. Loam molding was more common then than now, and the apprentice learned all branches, including melting, core making, brass molding, etc., and I want to say it required more ability to work in the comparatively small jobbing foundry of those days than perhaps the molders of to-day are apt to imagine.

As regards my own case, I never had any difficulty afterwards in holding my own in the big foundries, but I became

ambitious to become a business man myself, and, ultimately, I opened up one of these small shops on my own account. I had an abundance of work, and had exceptional success in collecting my accounts, but I could not see that I was being repaid for my anxiety and worry, so I passed it on.

This was many years ago, but in the years which have passed since then, I have seen many of these little foundries standing idle. Thus the subject of my story, "The Passing of the Small Foundry." I am now more than convinced that if these small foundries were properly managed, they could not only compete with the larger ones, but could surpass them in economical production of castings, and that they could also produce a superior quality of castings. This may be all buncombe, but supposing we argue it out and see wherein I am mistaken. "Figures will not lie" is an old saying, but unless we understand figures we can't use them. However, we will not jump at conclusions and say that a big furnace will melt more economically than a small one. How do we know that it will? Have we ever figured it out? Or, supposing we have 25 molders working in a row and we take away 24 of them, how does that affect the other one? In what way does it decrease his production? Or, supposing we have one man making a large mold and we put another one on with him, in what way does he cheapen the cost? Can the two make it in any less than half of the time that the one would have required? Now I am not answering any of these questions; I am just asking them, but I will say that I have worked in some very large shops where very large castings were being made, and it was proved by actual figures (according to the superintendent) that molders working in single units will produce more than if working in pairs or in gangs.

Now, to get back to our subject, I can take one thousand dollars and build a foundry which will produce three hundred tons of castings in a year. I am saying this advisedly and can produce the figures and back them up. Will ten thousand dollars build a foundry that will produce 3,000 tons of castings in a year? I could continue enumerate all of the details of a foundry and leave the figuring to my reader and I think he could prove to his own satisfaction that either in building or operating a foundry with a capacity requiring forty molders it will require at least ten times the cash which would be required for the foundry with four molders. Now, as I have already said, I am not answering these questions, I am simply asking them so that the prospective foundryman will have something to study over, and if he corners me up I will be glad of it; I well know that he is interested. I think I know what the first effort will be. As a guess, I will say that it will be to corner me up on that thousand dollar foundry with the three hundred-ton capacity. Of course this will not include a high-priced lot.

Electric Truck as a Means of Shop Transportation

The Truck Which Handles Baggage in Large Terminals is Also Admirably Adapted to the Handling of Materials in the Machine Shops—Trucks May Be Adapted to Special Uses

THE accompanying illustrations show the use of the electric storage battery trucks in modern industrial life as utilized for automatic transportation in loading and unloading ships and railway cars, and in the up-to-date machine shop, tire factory and textile mill and electric wire insulating and manufacturing plant. The supremacy of electric power trucks is acknowledged by freight handling experts, a conclusion which has been reached after rigid tests have been made covering a period of a number of years.

These power trucks were designed not only for the special purpose of handling freight and merchandise at express and steamship terminals, but also in foundries, warehouses and at all other places that require trucking about the premises. The control of these trucks is very simple; they may be operated with equal efficiency forward and backward by unskilled labor. Wherever they have been installed an actual saving in wages of 25 to 50 per cent. has invariably been effected over the old method of hand trucking.

It is pointed out that one particular type of truck has been devised for railway or steamship terminals and industrial plants having 4,000 pounds capacity and easily controlled and readily turned in a very small space. The power for operating is supplied by storage batteries of the lead or Edison type, conveniently located so that they may receive proper attention at any instant without delay or trouble. One charge of electricity is sufficient to do a full day's work under normal conditions. The trucks are very powerful, and when loaded with negotiate grades of from 15 to 25 per cent., with ease will cover a distance in one quarter of the time, and handle about six times

as much freight as hand-operated trucks, doing their work quickly, noiselessly, and efficiently.

It will be noted that one end of the truck contains the storage batteries, while at the other end of the truck is attached a movable end gate, which may be lowered to a horizontal platform. The end gate may also be lowered to the floor and used as a skid in loading or unloading the truck; this end gate may also be easily removed when not in use. Another pronounced advantage of these trucks is the fact that the platform and batteries are mounted on spiral springs which carry the load smoothly and reduce the possibility of breakage to a minimum.

The truck frame consists of two heavy 1 in. beam sections which extend the entire length of the platform, and which converge slightly into a reversed bend just back of the loading or steering wheels. The frame is supported on four tempered steel spiral springs, each of which is encased within a box and transfer the weights of loading directly to the steel axles. The pinion of the motor which through a silent chain engages the sprocket wheel about four times the diameter of the former and which contains a substantial and compact differential, transmits the mechanical energy through a Vanadium steel countershaft supported under two frame members of large annular ball bearings of ample capacity to two side chain drivers, giving a gear ratio with driving wheel of 12 to 1. This form of drive allows a speed change in four variations of from 1 to 8 miles per hour in either direction for freight and baggage trucks, and three variations of from 1 to 5½ miles per hour in either direction for industrial trucks.

The wheels revolve on a double set

of annular roller bearings of ample capacity and are equipped with either solid rubber tires of demountable type or Divine fabric tires, making a wheel of 16 inches in diameter. The steering is done by means of a lever conveniently arranged which moves in a vertical plane, providing a quick and easy manner as in all standard makes of automobiles, the steel axle itself being immovable. To one end of the freight and industrial trucks is attached a movable end gate which may be lowered to a horizontal position, thus increasing by nearly three feet the available loading space. This end gate may also be lowered to the floor and used as a skid in loading or unloading the truck, or removed from truck when not in use.

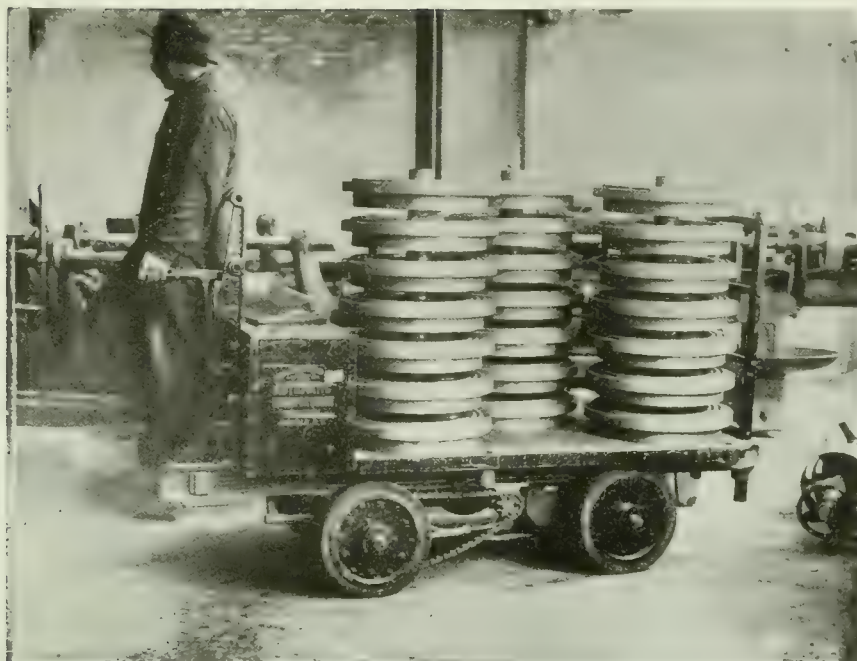
The power for operating is derived from a storage battery located in a steel case at driving end of truck, thus insuring maximum tractive effort. The current is taken from the batteries through a maximum capacity enclosed fuse, the circuit switch, and a specially designed drum type vertical controller, the latter being mounted on uprights convenient to operator and is connected to a set of resistances, and is operated by a lever moving in a vertical plane, giving four speeds forward and four reverse on freight trucks, and three forward and three reverse for industrial trucks.

Current cannot be sent into the controlling until the foot pedal has been pushed down by operator, which simultaneously releases the powerful bend brake on the countershaft and closes the circuit switch. The controller regulates the amount of current sent into the motor through specially designed resistances. From the controller the current is directed through insulated wires to a 2-3 h.p. motor.

The drum type controller and double



ADAPTABILITY OF THE INDUSTRIAL TRUCK FOR THE HANDLING OF PIPE OR OTHER LONG MATERIAL.



THE ELECTRIC TRUCK IN THE MACHINE SHOP.

break switch have proven so efficient as to eliminate the arcing and all dangers found in operating other electrical vehicles. These trucks may be operated without the slightest danger from fire. The current cannot be applied to the controller without first releasing the brake, which automatically closes the circuit switch, at which time the controller will carry the current from the batteries to the motor. The moment the current is cut off the brake will set automatically and remain set until the circuit switch is again closed, at which time the band brake is automatically released. The motor is 2-3 h.p., having a high starting torque and exceptionally high efficiency, and is series wound for 24 and 48 volts. The armature is carried on Hess Bright annular ball bearings, and has a sufficient capacity to handle a loaded truck up a 15 to 25 per cent grade.

This industrial truck is the model used for warehouse and industrial use, and has a very short wheel base, and will make exceptionally short turns. It is light and very flexible, and on account of its size may be operated in narrow aisles and run into elevators to be conveyed from floor to floor. Trucks of this design are proving a great convenience, making substantial savings in time and wages in the hundreds of plants where they are in daily use. The length over all is 7 ft., and the length of the platform loading space is 5 ft. 1½ ins., while the length of the platform loading space with end gate is 8 ft. The width of the platform is 36 ins. and the height of the battery box is 17½ ins., the width of the battery box being 14½ ins. The height of the platform is 20 ins., and the wheel base measures 38 ins., while the width of tread is 32½ ins., the drive being double side chain with 3 speeds forward and 3 reverse, 1 to 5½ m.p.h. The weight with Edison battery is 1,800 pounds, and with a lead battery 1,850 pounds, while the total capacity is about 4,000 pounds.

The electric battery truck was designed

to haul four-wheeled or other trucks with loads of two to ten thousand pounds, thereby doing the work which is usually accomplished by men or with mules. One tractor will do the work of several mills of from four to eight men. The tractor does not operate on rails and may be used wherever required in and about factories and warehouses. These tractors have proven to be of great value in mills, industrial plants, factories, warehouses, and in many other places where trucking is usually done with four-wheel trucks. The tractor has a length over all of 6 ft. 2 ins., and a width of 36 ins., the height of battery boxes being 14½ ins., while the height of platform measures 20 ins. The wheel base is 38 ins., and the width of tread measures 33¼ ins., while the double side chain drive is used with 3 speeds forward and 3 reverse, 1 to 5½ m.p.h.; the weight with Edison battery being 2,200 pounds.

A novel electric battery elevating platform truck has been developed at Buffalo, N.Y., which is gear driven, all the gears being entirely enclosed in a steel case

and in a bath of oil at all times, thus insuring perfect lubrication and silent operation. The steering is by all four wheels and operated by steering lever working in either vertical or horizontal plane. Turning radius is less than six feet, enabling the truck to turn sharp corners and operate practically any place where a hand truck may be used.

This truck is fitted with electric elevating platform with a capacity of 4,000 pounds, designed to convey tables or platforms of wood or metal on which loads may be carried from place to place as desired. Lifting planes are raised by means of an electric lifting device operated by individual motor, using power from truck battery of ample capacity to operate truck and elevating platform a full day. The lifting is by means of steel worm and phosphor-bronze gear, insuring extreme efficiency and the lifting device is controlled automatically, is silent in operation, sure in action, and dependable. This truck is also used for ordinary trucking purposes, carrying loads of its own or may be fitted with draw head and used as a tractor to haul the ordinary hand operated trailers from place to place.

A storage battery industrial engine has also been designed to meet the requirements of industrial railways in and about manufacturing plants and other large industrial concerns. It is compact and very powerful, and has a direct gear drive on all four wheels. The wheel flanges may be placed on either side or outside of the rail and adapted for all standard industrial trucks from 18 in. to 36 in. gauge. This engine is exceptionally efficient, and has a hauling capacity of 8 to 12 tons on the level, and is used in hauling trains of several cars.

Automatic charging rheostats have been developed expressly for charging trucks, tractors, and engines, and are equipped with underload and overload circuit breakers. These rheostats are intended to charge lead or Edison batteries. The lead battery rheostat is used to charge at three different ampere rates, and the Edison battery rheostat to charge at a single rate and is improved with a "boost" switch at a small additional cost while volt and ammeters are provided on the charging panels.



THE ELECTRIC TRUCK IN THE MACHINE SHOP.

A PRESS SAFETY GUARD

By F. C. P.

The accompanying illustration shows a safety device designed for punch presses and drops as developed at New Britain, Conn. The photograph shows a pillar press with bracket A arranged for the application of the safety device by first attaching bar G to bracket H with the square head clamp screw. If the trip rod is at the right hand side of the press, it is necessary to assemble the bamboo bar to bracket H with the aluminum casting attached to the bamboo bar at the right hand side and then assemble rod I through the holes in bracket H and through the loops of bamboo bar, holding bar I in position with the two small collars.

With the device assembled in this manner, it is necessary to place bracket A at the left hand side of the press at a height which will allow the bamboo bar—when the assembly is placed into bracket A—to have a position so that the operator's arm will come in contact with this bar as he places his work upon the die. This carries the bamboo bar forward and with it locking bar through the loops on bracket B and under dog C, which is attached to the trip rod in

be assumed that the mere installation of a safety device will prevent the operator from being injured. The device must be carefully adjusted when the job is started and this adjustment must be maintained throughout the duration of the operation. The operators must not be allowed to tamper with, remove or render inoperative the safety device intended for their protection. Constant watchfulness on the part of the foreman is one of the conditions under which safety is secured.

This guard consists of a free-swinging rod of light material, so attached to the machine that the trip cannot be operated while the hands are in danger of injury. It touches the arms above the elbows with a pressure that is hardly felt, and does not in any way interfere with the use of the hands or arms, or require a single special motion. Workmen do not object to its use.

It is attached to a bracket on the machine, and can be instantly removed or replaced at will. It can be used upon any machine without interfering with the action of the trip or obstructing free access to the dies or other parts.

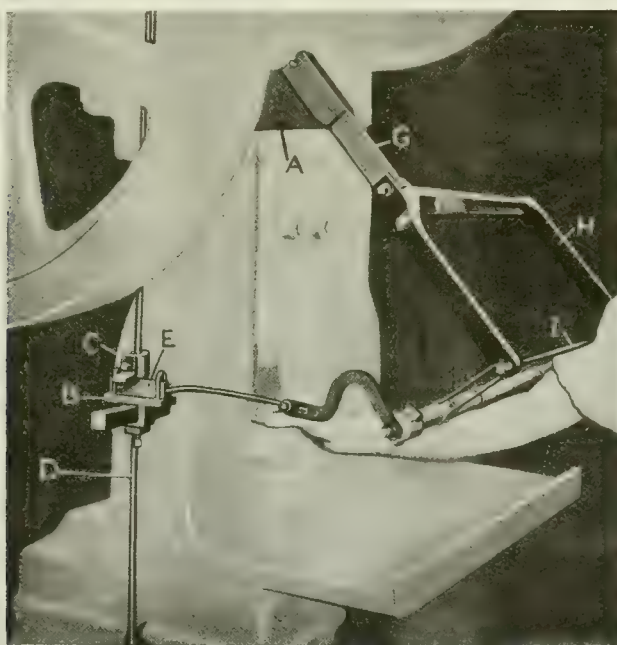
The power press is the most dangerous type of metal-working machine, and

tion which secures the highest output, for both hands and one foot are used. After a very short experience the workman has no thought whatever of the presence of the mechanism. He does not see it, and he is unconscious of the bar. The weight against his muscles is never more than a few ounces.

However, before the hands can reach the danger zone of the dies, the pressure of the arms upon the bamboo bar locks the tripping mechanism so that the ram cannot descend. Before the machine can start both hands must be withdrawn. When it starts no danger exists unless the operator actually thrusts his hands over the guard, which would be a clumsy and difficult thing to do and would be so deliberate an action as to be classed as intentional.

DESIGN OF FURNACE

To ensure good combustion it is of the first importance to keep the gases in the furnace as hot as possible, until the oxidation is entirely completed; but this fundamental condition is far from being realized in ordinary practice. In setting a horizontal tubular boiler, for example, it is usual to place one end of it immediately over the furnace, so that it is exposed to the direct action of the fire. In this way the gases, which are at a temperature of perhaps 3500° Fahrenheit as they rise from the fuel-bed, are covered, over the entire area of the furnace, by a metal roof or plate that has a temperature of perhaps 350°. In other words, the entire upper boundary of the furnace is maintained at a temperature some two thousand degrees lower than that of the furnace gases. The absorption of heat by this relatively cold surface chills the gases so that sensible portions of them are cooled below the temperature at which they are capable of uniting with oxygen; and if these cooled portions are not already completely oxidized, they are likely to escape up the chimney unconsumed, and a consequent waste of fuel is the result. The waste that is caused in this way can be minimized by properly proportioning the furnace, but it cannot be really eliminated so long as no attempt is made to burn the fuel under scientific conditions.



SAFETY GUARD FOR STAMPING PRESS.

a position high enough to allow locking bar E to go between bracket B and dog C, preventing the trip rod from being drawn down by the operator until his arm is removed from the danger zone, returning the bamboo bar by gravity, carrying with it locking bar E.

The illustration, Fig. 3, shows the operator with his hand in the danger zone and in this position has carried forward the locking bar E over bracket B and under dog C, making it impossible for the operator or any other person to trip the press until the operator's arm has been removed. In noting how they prevent accidents in the plants of the American Hardware Corporation, New Britain, Conn., by the use of this guarding device, it is urged that it must never

the danger is accentuated by the fact that in very many cases the operators are not recruited from the most intelligent class of labor. In plants where presses are used in large numbers the percentage of accidents and the resulting losses from idle hours and from compensation for injuries reach large totals unless the machines are equipped so that the man or woman is actually prevented by mechanical means from taking risks either deliberately or through carelessness.

With this device the operator works with the contact of a light rod against the arms above the elbow. The pressure is hardly felt and there is no interference whatever with the action of the hands. Production is carried on under a condi-

A Correction.—An unfortunate error occurred in connection with the advertisement of the Montreal General Tool Co., which appeared in our Annual Review Number, page 356. Under the heading of "Shop Equipment" the words, "10 Drill Presses Swing up to 60," should have read, "16 Engine Lathes swing up to 60." This firm is exceptionally well equipped to handle general machine shop repair work on very short notice.

Quebec.—Never in the history of navigation on the St. Lawrence has a steamer left Quebec for the open sea so late as did the "Canadian Voyageur," which left Quebec on the 23rd January for Halifax and then overseas.

Moulding and Pouring a Gasoline Engine Bed

Showing Method of Casting a Sheet Steel Bottom Into a Grey Iron Casting, Making the Entire Bed Into a Tank—Also Small Chamber Cored Off From the Large One

By F. H. BELL

Making the Mold

By permission of Mr. George McCrea, the general superintendent of the works, we will endeavor to demonstrate how the molds are made.

In Fig. 1 are seen four beds, the appearance of which might indicate a very simple design, and on taking into consideration the number of improvements and new ideas involved in their make-up, they may be truthfully termed simple. These four are but a few of the many sizes built by this company and ranging from one horsepower to fifty horsepower, being slightly different in design, but all having the same fundamental principles.

Originally when these beds were cast with the wide open bottom and the bridge wall shown at X, Fig. 1, was lacking, the molding was a much simpler operation. To mold a bed of this type requires a 4 part flask, viz., the drag or nowel A, the cheek B, the cope C, and the small cope D, which covers the bearings.

The first move to be made is to level the bottom board E, on the floor and ram up the drag A, right side up, and strike it off and sift it on a little facing sand, after which the pattern is centred and rapped down to a solid bearing, care being taken to always keep it level. The pattern, it might be explained, is solid and all in one piece, with the exception of the bearings Y, Fig. 1, and the small pipe connections on the side, Z, Fig. 1. The parting is next made by ramming in extra sand to insure a good solid joint and striking off even with the flask. It is now troweled smooth and parting

sand put on, after which it is ready for the cheek B to be put in place and rammed. The top of the cheek, as will be seen in Fig. 3, comes even with the straight part of the pattern. This cheek is chucked to fit the shape of the pattern so that very little trouble is ever experienced in holding the sand in shape. After ramming the cheek and making the parting the cope is put in place, and as shown in the different illustrations has the shaft bearings protruding through it, and level with the top of it, also bars fitted down into the crank pit between the bearings. So complete are these flasks constructed that very little gagging is required.

After the cope is rammed up to the shaft bearings they are bedded in and another parting made for the small cope D which covers this portion. After ramming up the small cope the remainder of the work as regards the molding of the outside of the casting will require very little detailed explanation. The small cope is lifted off and put to one side, the bearings are swabbed and vented and drawn out, after which the horns which hold the shaft bearings are rapped and the main cope carefully lifted off and rolled over. The cheek is now swabbed and vented all around and scored off as shown at F, Figs. 2 and 3.

In lifting the cheek the pattern is secured and lifted with it and rolled over on horses, thus giving the workman an opportunity to see that his joint is all right before drawing the pattern. After drawing the pattern the mold is finished and plumbagoed in the usual way.

THE "Ideal" gas, gasoline and kerosene engine, one style of which is shown in the accompanying illustration, and also shown in part in the succeeding engravings, is, and has for many years been manufactured by the Gould, Shapley & Muir Co., of Brantford, Limited, and viewing it from the exterior it is of similar appearance to the original engine built by this company, but on examination of its interior mechanism it will be found to be vastly different.

With the increased knowledge born of experience and the progress made in gasoline engineering generally, came the necessary alterations and improvements. This, coupled with the shortage of gasoline owing to exigencies of the war situation making a substitute for gasoline imperative, has made at least the foundryman's part of the work an entirely different proposition.

It is not our intention in this article to describe in detail everything which the foundryman has to do in the construction of the engine, but simply to confine ourselves to the molding and casting of the bed, it having probably undergone as many changes as any part of the engine. In order to properly understand these beds it is perhaps as well to explain what is required of them. The gasoline which formerly constituted the fuel was held in a container enclosed within the bed. The container consisted of a galvanized can of the proper dimensions to fill all the available space, but this galvanized receptacle would frequently be punctured in transit from the works to its destination or otherwise, and at best it was not any too long-lived. It was therefore deemed practicable and advisable to cast a bottom to the bed, thus utilizing it for the purpose spoken of. This was achieved with a fair degree of success but entailed a considerable amount of extra trouble and expense, besides additional risk of loss in the foundry as well as making a clumsy casting. The shortage of the gasoline supply as we have said made a substitute necessary, and coal oil has been found to do equally as well once the engine is under headway, but for starting purposes a small amount of gasoline is necessary.

The Steel Bottom

It therefore remained for the foundry superintendent, Mr. Robert Rutledge, to use his ingenuity in devising the means of "casting in" the steel bottom, which is now so successfully accomplished, as well as providing a small chamber for gasoline, while giving over the main space for the "new explosive" coal oil.



ENGINE BEDS AS THEY COME FROM THE MOULD.

Building the Core

After the removal of the cheek and pattern the drag will show the imprint of the bottom of the patterns which is practically flat, all but the bearing strips on each side and which project a short distance into the sand. On top of this impression the core boxes are placed and the core built in its place (and it is right here that the real mechanical ability of the molder is put to the test). The steel bottom G, Fig. 2, consists of a sheet steel plate somewhat larger than the core. This plate is ground all around the outer edge so as to give a clean surface as well as an easily fused body for the melted metal to burn onto. The manner of "casting in" the steel bottom is to have it built into the core with the ground edge projecting out from the core as shown at G, Fig. 2, into the space allowed for the casting and about an inch above the bottom. This gives abundance of strength of metal below and also provides air space between the bottom and the foundation of the engine when in use.

In starting to build the core a frame of the size required for the core and of the depth required between the steel plate and the bottom is placed on the imprint left by the pattern on the drag. This frame is rammed full of sand and struck off level. The frame is now removed and the steel bottom put in place

on top of this thickness of sand, after which the core box is placed where the frame was removed from, and the balance of the core H made up. The core I, Fig. 2, which is separated by the bridge wall X, Fig. 1, from the main core H, forms the small chamber in which is held the gasoline. This core I is a dry oil-sand core, so also is the portion of the core J under it, as well as the cores K and L. The balance of the core H is green molding sand. The core box for the green sand core is open-topped excepting the portion where the square opening is shown with the vent hole M and the iron post marked N. The balance is swept to shape with a strickle. The fact that the core rests on a steel plate makes it more difficult to hold down than if it were rammed into the sand forming the drag, and the fact that the vent has no means of escape excepting through the vent hole M makes it imperative that careful provision be made for securing the core as well as venting it.

Before putting in the sand to form the core a sectional grid is placed on top of the steel plate and over this a stout bar is laid running lengthwise, and on top of this is stood the upright bar which reaches to the surface at N, Fig. 2. This bar N, as will be explained later, is held down from the top and in turn holds the entire system of rods which keep the plate in place.

The green sand portion of the core is now rammed up, the interior of which is filled with fine coke. The top is put on the level part and the sand tucked under and also the cores K and L are tucked into place, the core box being a guide to go by. The curved part is now strickled into shape and the core vented down into the coke. The core box being lifted off the core is slicked and finished. The core J, which forms part of the main coal oil chamber fits tight against the plate and also against the core H. The core I rests on chaplets on top of the core J and is separate from the core H, thus forming the wall shown at X, Fig. 1. The vent from both of these cores is taken out through the top of the cope at the point also marked M. In gating this mold two gate sticks are stood at the points OO, Figs. 2 and 4, and the gates are cut from these to the bell at point, just missing the core and traveling close under the steel plate so as to heat it, but not close enough to cut it away. Two overflow risers are taken off at P P, shown in all the different views in Fig. 4.

In closing this mold there is little to take note of. The cheek has to be closed so as to give even thickness on both sides and in case it is not properly centred, the cheek may be moved so as to rectify it by withdrawing the long guide pins which are not fastened. The top of the cheek is best to be floured and the cope tried on and off, thus giving the



FIG. 2 - MAKING THE MOULD FOR AN ENGINE BED PLATE.



FIG. 3—SHOWING CHEEK IN POSITION AND COPE BEING LOWERED INTO PLACE.

workman an opportunity of seeing that it has not been crushed and also to see that iron cannot get into the vents. In ramming the cope an iron was rammed into it in such a manner as to rest on the iron N in the core and reach up through the cope, and when clamping the mold this iron is strapped down and clamped, holding that end of the core secure. Before closing on the small cope, stud chaplets of the proper length are placed on top of the cores K and L and the half round cores which form the shaft bearing are put in place in the prints and also resting on the chaplets. When the small cope is closed on top of these and clamped the entire combination of cores and chaplets are held as in a vise.

As shown in Fig. 4, the risers P P are headed up; these may have a basin of sufficient capacity to hold what is flowed through or they may be on a slant so as to flow the iron over into a sand bed. The runner basin is also raised to the level of the risers and the two gates are connected by this basin. This style of bed has been a decided success as not a complaint has been recorded against it. The steel plate instead of putting a strain on the casting actually strengthens it. The iron passing in from the gate heats the plate almost to the melting point and the casting being heavy and the plate light gives the plate time to become heated throughout before the casting sets. Thus, when the casting contracts the plate also contracts with it, with the exception of the central part, which might not be as hot as the rest, and this can easily buckle up or down without in any way doing harm either to itself or to the casting. The molding of this bed, like that of any other casting, depends for success on the care and good judgment of the workman. The gas or vent must have some means of escape else it will cause a blow. If the inside is properly vented to the coke, and if the outlet from the coke is

well guarded so that nothing obstructs the way, and all joints around it are floured so that no metal gets in there should be no fear of trouble from that source. The gates should be of sufficient size to allow the iron (which should be in a good fluid condition) to flow in without hindrance, otherwise cold shots may give trouble. The workmen shown in the illustrations require no pointers on this score.

Another point worthy of note in connection with this work is the oil sand cores spoken of. These cores are made from silica sand similar to what is used in the manufacture of glass, and while it perhaps costs a little more than river sand there is a real economy in its use. One part of linseed oil or any good prepared core oil is sufficient for 65 parts

of this sand. The advantages from this are apparent. The sand being pure silica generates practically no gas and the small percentage of oil required would create so little gas that it would be hardly perceptible. The grain being fairly coarse and ragged gives the core a chance to bake hard and at the same time have a good open structure, through which the vent can pass with ease, thereby obviating the necessity of venting to a great extent. This sand is used for jacketed cylinders, etc., with the best of success. Superintendent Rutledge showed us some very complicated cores which required no venting whatever. Cores which formerly had to have vent holes connected to the vent holes in other cores are now successfully handled without vent holes at all. From a monetary standpoint a cheaper sand with a higher percentage of binder, and more labor required would in all probability be the most expensive in the long run, particularly when the greater risk of bad castings is taken into consideration.

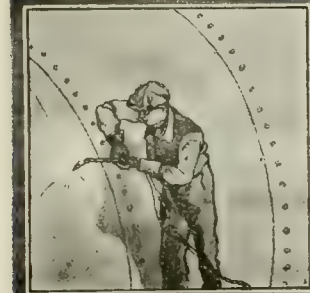
HEATON'S ANNUAL FOR 1919

The 15th edition of Heaton's Annual has been issued by Heaton's Agency, Toronto. Little need be said regarding the value of this work to those wishing statistics referring to matters of Canadian origin, and the present edition contains an official directory of prominent men of the Dominion, postal information, financial information concerning the financial life of the country, and commercial regulations dealing with the income tax, war taxes and other legal matters pertaining to business. Information of value to those transacting business with firms at a distance through the various means of transportation is contained in another section, and customs information is given in a very complete form. Much other information of the usual statistical nature is also given.



FIG. 4—TO LEFT, BUILDING POURING BASIN AND RISERS. TO RIGHT, WORKMEN CLOSING ON SMALL COPE.

WELDING AND CUTTING



A BELGIAN ELECTRIC CHAIN-WELDING MACHINE

By Frank C. Perkins

THE accompanying illustration shows a novel Belgian electric chain-welding machine of the Giraud type as made at the plant of the Electro-Mechanical Tool Co. at Arbre Benit in Brussels. These electric-welded chains are tested for 66 cwt. for rupture, while the Lloyd requirement for the same size, 5-16 in., is only 22 cwt. A metal-selected suitable for welding electrically with low sulphur, carbon silicon and phosphorus, so that the place electrically welded becomes stronger than the other sections. The electric-welded chain does not break at the weld but on the solid part of the link.

It has been proved that a chain-bending and electric-welding machine has a capacity equal to the output of ten workmen for the quantity. There is the additional advantage that the rings are absolutely similar and the welding of the highest quality without changing the nature of the metal. If, for instance, a hand-made chain has a tensile strength equal to about 55 per cent. of the tensile strength of the double section of the wire used, then electric-welded chains are able to stand a strength of over 80 per cent.

It is said that these machines secure a saving of at least 80 shillings per ton, of products made compared with the actual cost of manufacture in England.

The advantages of electric welding include the homogeneous nature of the weld as when the weld is made the structure of the metal at the joint is the same as elsewhere.

There is absolute control over the heat by simple appliances and the metal can be held at any temperature desired for any length of time, and the heat increased or decreased at will. The welding process can be continually watched as the metal, while heating, is visible instead of being covered with coal or hidden by flame, as in the forge process.

This process avoids flaws as the union commences at the interior of the joint and not in an uncertain way, consequently any flaw can be easily discovered and prevented. Electric welding is rapid as the process is almost instantaneous with small sections, while with larger sizes it requires but little time, depending upon the horsepower used.

The flexibility of the process is a great advantage applying as it does to various kinds and forms of metals, including those which have heretofore been united only by brazing. The welds are kept in perfect line by the clamps during the operation, and there is a localization of heat at the weld, consequently no heating effect elsewhere.

Its great cleanliness is apparent and the apparatus can be used in any convenient or desirable place as it makes no dirt or litter. There is no blistering or scaling and the heat is confined to the

welded joint. The machine is simple and easy in operation, while the current used is of such low voltage as to render shocks even of the slightest kind impossible.

These electric welding machines produce chains for apparatus for hauling and raising, and the chains for railroad trucks, tenders, locomotives, tramways and mines, also electric-welded chains for different work in the country, on farms for agriculture work, and twisted chains for artillery and autocars.

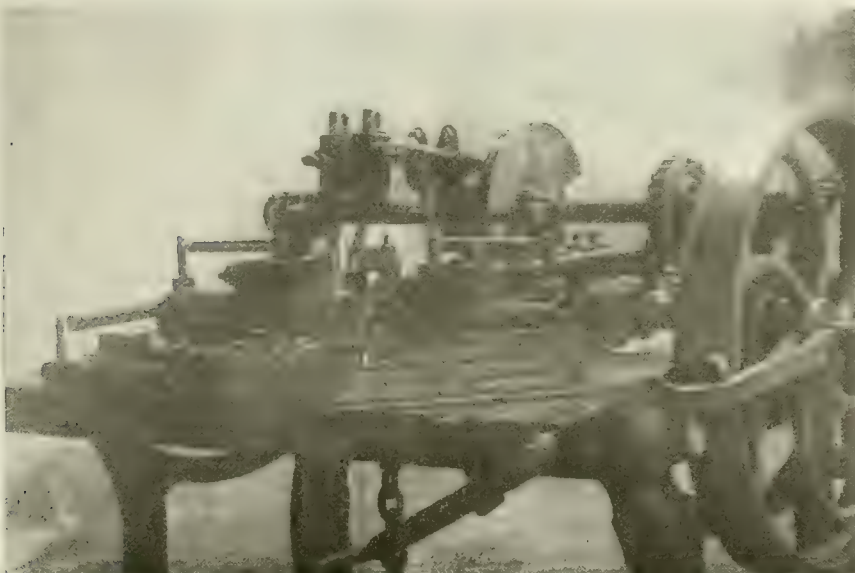
It is pointed out that the most important item, next to the cost of production, is equality of production, and in this the electrically-welded chain has many points of superiority. To show the tensile strength of the electrically-welded chains, an American chain maker secured six pieces of 9.32 inch chains, two of common quality American make, two of steel, American manufacture, supposed to be the strongest possible chain, and two made by the electric welder.

One of the first samples broke at 2,200 pounds and stretched about 8 per cent., and the break occurred at one of the quarters of the weld. This is said to be a striking indication of the imperfection of the weld in common chain. The hand-made chain, supposed to be the strongest, used for logging purposes, where a chain of high tensile strength is demanded, broke at 3,500 pounds. This chain was purposely made heavier in the weld to strengthen the acknowledged weakest point. The elongation was 25 per cent.

The electric-welded chain broke at 700 pounds with an elongation of 40 per cent. Tests of chains welded at the end of the link show that 75 per cent. or more break at the weld, due to imperfect welding. A perfect link must be welded at the side, where the wear is the least. A link tested in a fire is heated from the exterior inwardly, consequently the outer surface reaches the welding heat first. This is not true of the electric-welded link.

A new Belgian bending and electric-welding chain machine has been designed to manufacture automatically iron and steel chains up to $\frac{3}{4}$ in. diameter of wire. This chain machine, to weld electrically chains up to $\frac{3}{4}$ in. diameter of wire, has an electric consumption showing a saving of 28 per cent. against older types of welders.

The advantages of the mechanically coiled and electrically welded chains in comparison with the hand-made, or



BELGIAN CHAIN WELDING MACHINE.

chains made in any other way, are many. The mechanically-coiled chains are coiled on a mandrel by the machine itself, and all the links are and must be absolutely the same. Those chains are consequently, by their construction, especially well adapted for pulleys, blocks and similar tools. It is pointed out that the great regularity of the links gives to the mechanically-made chains an exterior appearance far more satisfactory than the hand-made chains, whose links are never of the same size in the full length of the chains.

On account of the electric welds these chains are also safer than hand-made machines, as in the latter process the weld is realized at one end of the links, so that, if the chains are at work, the load may be on a part of the chain where the metal has had an alteration in structure.

The electric weld is made in the middle of the long part of the links, and consequently when the load is on it is at a place which is safe in all cases. The superiority of these electric-welded chains is due to the fact that the weld of the links is made mechanically at the moment when the metal is brought to the welding heat and the weld can never occur when this heat is not obtained. In the older systems, on the contrary, the links are welded at the time when the blacksmith believes that the necessary heat has been obtained, and there is no doubt that in those cases the results always depend upon the ability of the workman.

ITALY UTILIZES VOLCANIC POWER

The present enormous price of coal in Italy, according to the Italian Bureau of Public Information, has resulted in the realization of an idea which at first thought seemed but a dream, but which instead has been developed in a marvelous manner and is assuming quite considerable importance; this is the industrial exploitation of one of the features of vulcanism and that is the natural heat emitted from the soil in those regions more or less volcanic in character.

The first experiments along this line were made some years before the war by Prince Ginori-Conti in Tuscany at Larderello, near the salt-mines of Volterra, a region extensively covered with volcanic formations, the most wonderful being the so-called "soffioni," which are certain volcanic vents emitting powerful jets of very hot steam containing boracic salts and various gases used in the extraction of boracic acid. Instead of limiting the use of these steam-jets, as in the past, to extracting the salts contained in the exhalations of these natural vapor-vents, the ejection of the steam is stimulated by boring holes. In this way it is possible to obtain powerful jets at a pressure of two to three atmospheres, according to the locality, and in some exceptional instances as high as five atmospheres, the temperatures varying from 150 to 165 degrees centigrade. These jets maintain their force and temperature unchanged for many

years, and they are not affected even when other openings, not too near each other, are bored in the ground, proving that they do not influence each other reciprocally, so great is the underlying thermic energy below. In 1905, Prince Ginori-Conti applied this natural steam to a 40 H.P. engine, using only a small section of the Nenella fissure, which is the most powerful "Soffione," the steam ejected having a pressure of five atmospheres.

The results obtained during several years of experimentation were satisfactory, so that he continued to make larger and deeper borings, measuring the force of the steam ejected; combined, this force could operate engines of many thousand horse-power.

In 1912 an experiment was made, very wisely on a more modest scale, but sufficient to obtain conclusive results, for which a 300 H.P. turbine-alternator was used.

Later, because of the enormous increase in the price of coal, the Prince decided to exploit the thermic energy of these soffioni on a much larger scale, but as other substances are emitted with the steam, among them sulphuric acid, which corrodes metals, particularly iron, and therefore the pipes in which the steam was to be collected, he attempted to use this steam only for heating. Three turbine-alternators of 3,000 kilowatts each were installed, fed by boilers at low pressure not heated by coal or other combustible fuel, but by the natural steam, superheated to 165° C., issuing from these soffioni and piped and carried to the boilers.

To-day the works at Larderello have a central plant of 16,000 H.P. operating without interruption and distributing current to Florence, Livorno and Grosseto; its capacity is soon to be increased.

Here we have a new and original utilization of Italy's natural wealth; current is generated not by the use of "white coal" (water-power), but by means of heat energy of volcanic origin.

As the natural steam available at Larderello and the surrounding country is, one might say, unlimited and depends upon the number of bore-holes made in the boraciferous soil, the great possibilities for further development are readily seen.

ELECTRIFYING ITALY'S RAILWAYS

Great savings in the use of coal, according to the Italian Bureau of Public Information, have been effected in Italy in the past few years through the electrification of railroads and harnessing the water power of the country to generate electricity. The percentage of railroads electrified in Italy from 1900-1915 is greater than in any other European country, and the economies resulting have been gratifying.

Electric traction of railroads began in Italy in 1900 with installations on the Varesina Line, which runs through Milan, Gallarate, Varese and Pontecer-

esio, and on the Valtellinese Line, which runs from Lecco to Chiavenna.

Railways which run on mountainous routes and carry heavy trains have been installed with different systems. The principal mountain routes electrified are the Moncenisio line, the Ceva-Port Savona line, the old line of Giovi, and the new supplementary Giovi line. These cover some of the most difficult territories traversed by any of the railroads in Europe.

The Moncenisio line is the longest of the mountain railways. It is 8.5 miles long, travels at an altitude of more than 1,000 yards above sea level and is continuously on the ascent. It has a nominal carrying capacity of 640,000,000 tons per mile, and actually carries 240,000,000 tons. The Ceva-Port Savona line is a series of steep inclines and declines. The Giovi line has the most rapid descent of any railroad in Europe and the supplementary Giovi line carries the heaviest traffic in Italy.

The perfect systems installed on these mountain routes have made possible the increase in the carrying capacity and the speed of the railways. There is at present under consideration the electrification of 1,250 miles more of railways.

MECHANIC'S AND DRAUGHTSMAN'S POCKET BOOK

Sir Isaac Pitman and Sons, Ltd., London, have published a pocket handbook of the above title for use of draughtsmen, mechanics and others, who have frequent need of some reference work for the recalling of formulae, etc., used in every-day work. W. E. Dommatt, the author, in his preface states that the work, notes and diagrams are not intended to replace text-books, but to act as a means for refreshing the memory in cases where the latter has become imperfect. Mathematical tables are given in compact form and include squares and cubes of numbers, square and cube root, temperature conversion tables, areas and circumferences of circles, trigonometrical functions, tapers and angles and logarithms.

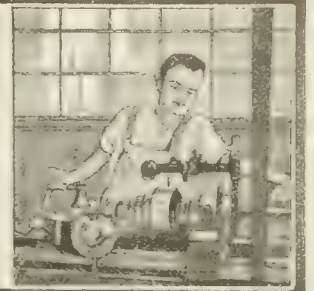
The above tables are those usually found in works of this type, and in addition to these some extremely useful tables are given, which are seldom seen. These have to do with the coefficient of friction of various materials, revolutions of wheels or discs per minute, and the centrifugal force exerted by a rotating mass of one pound, at various speeds, etc.

Wire gauge tables, specific gravity and other weight tables, thread tables and other tables dealing with the properties of materials are included.

The sections dealing with trigonometry, mechanics, statics and logarithms, together with that on mensuration, are of particular value, and while the book is of 125 pages, much information of real value has been condensed into a small space and the book should prove a welcome addition to the reference library of those who have occasion to use material of this nature.



WHAT OUR READERS THINK AND DO



Views and Opinions Regarding Industrial Developments, Factory Administration and Allied Topics Relating to Engineering Activity

ROUNDING UP WORN CRANK PINS

By A. L. Marshall

THE tool shown has given me so much satisfaction in rounding up worn cranks that I pass it along, hoping that it may be useful to others. The lower half of the tool-holder is made of machinery steel and case hardened; the upper half is of cast iron with a generous oil hole way cut through. The cutting tool at A is made as long as the crank is wide, while the body of the tool-holder is made slightly shorter. The hole is bored to the largest diameter of the crank pin B, with about 3-16 inch opening at C and the corners rounded to suit the fillets. In operation the tool-holder is clamped around the crank and as the tool-holder or the crank is revolved it is drawn together with the screw shown. A small set-screw near each end of the cutting tool serves for adjustment. The space D

that but few of their men were doing their best in the past. Almost without exception women have done more and better work than the men on jobs that were within their strength and training. And none of those women would tell you that they were overdoing or were working harder than at their household tasks of old.

The truth of it is that the men have thought they could not be replaced, that the learning of their trade, or membership in a union, would insure them a position no matter how little they did. On the other hand there are thousands of conscientious workmen who have done their best and who bear the same relation to the men "shown up" that the women do.

It's the old story of to earn more and get ahead one must do a little more than he is asked to do and must turn a part of his spare time into learning. We

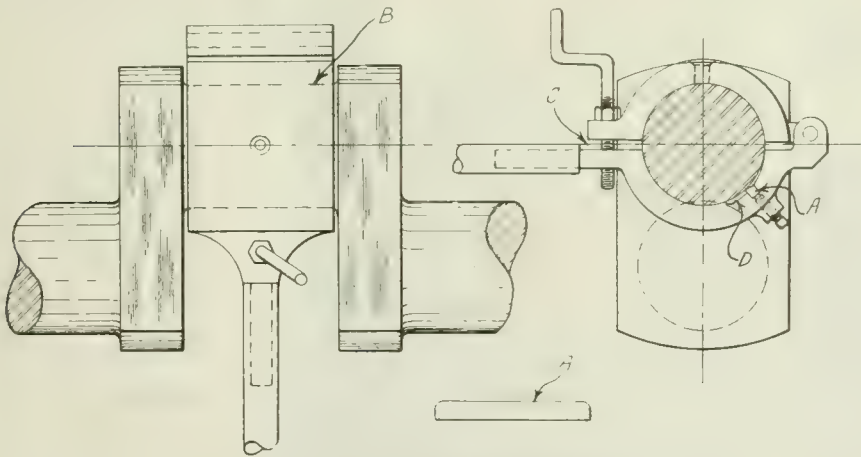
it: "Fred is just the man I want," he said, "but I dare not trust him for fear he will go off on a bust just when I need him most—I would pay him ten to twelve dollars more a week than he gets now, his work would be pleasant and interesting, and I would give him the job at once if he had ever kept his feet down for one whole month straight." Just an instance of where a man had to be imported to fill a place that should have been by promotion.

On repetition work women have shone particularly bright. Light machine jobs and assembling do not grow tedious to them, or else they have more will power to force themselves to stick at the work than the men. I have had women who would sit from seven until twelve, perfectly contented with their work, while a man or boy on the same job would lose from twenty to thirty minutes and insist that it was absolutely necessary to do so—and this on day work with no suspicion of a bonus. The women simply surpassed the roving spirit.

And these "girls" think about their work, too. In our own shop on Government work, we found that the finest way to speed up and to upgrade the quality of any unit was to place a woman or two in the gang that was turning out that unit.

One plant that used women almost exclusively for automatic machine work had the usual male setters and overseers. Some of the machines were roll fed and a girl tended several. One of these girls discovered that by unwinding a roll and straightening out a short section, placing the roll on her stool beside the machine, she could feed the strip in right after the old spool was exhausted without stopping the machine to thread up. It required a cool head and deft fingers, but it was perfectly possible with these and effected a big saving in a day's run. The setter in the department complained that the girl was disobeying instructions, taking things in her own hands—and the superintendent investigated. After seeing the trick done the setter was called to the office and most awfully censured for not being ready to learn from the women; the girl in the case being substantially remembered and detailed as instructor for the room.

It is true that the men have had a chance to squeeze that never came before and they have made the most of it for which they cannot be blamed, but



RIG FOR TRUEING UP CRANK PINS -

serves for the collection of the chips, and care must be taken that it does not fill up and score the pin. With a good supply of lubricant and a little care a crank can be rounded up in about 10 minutes. In this particular instance it might be stated that the tool was used on cranks for nail machine spindles, where the wear is chiefly on the high side of the crank and the little difference in throw did not matter.

SHOWING UP THE MEN

By D. A. Middleton

The introduction of women in machine shops has taught managers one thing—

are told not to expect an old head on young shoulders, but the corollary to that is that scatter-brains never led to fame and fortune. Some years ago in a village there was a shop of a dozen men, one of whom we will call Fred, a young man of ability and experience, but ready at any hour of the day or night to throw up work or business for a lark. The scale of wages, which was just for local conditions, was about fifteen dollars per week except the foreman and the man who did the drafting, some experimental work, and helped the owner with the business end of things. The man who had occupied the latter position died and the owner was talking to me about

their very golden opportunity has opened the way for an influx of fresh troops who have won by their persistency and inexperience. To the foreman and all other executives, the advent of women

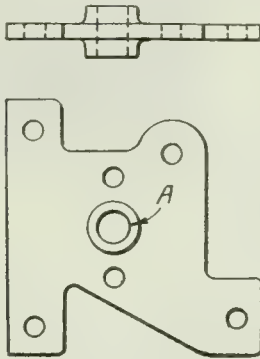


FIG. 1—PIECE TO BE DRILLED.

workers has been a bright spot on a dark and exhausting horizon. These executives have seen mere power to feed a machine earn more money than they with their years of training and their less manual though more taxing labor. If any one thinks it is an easy task to direct a gang of more or less willing workers, he is advised to talk over an exchange of positions with his immediate superior—the latter will not hold out very long before agreeing. A successful superintendent was heard to remark not long ago, "when this war work is over I am going to take a good, long rest—by working in the machine shop with the boys."

SIX HOLE DRILL JIG

By A. E. Kipps

The drill jig, as shown in accompanying sketch, was designed to accommodate the peculiar shaped casting drawn at Fig. 1.

It will be noticed that there are seven holes in this piece, but as the centre hole has already been drilled in a previ-

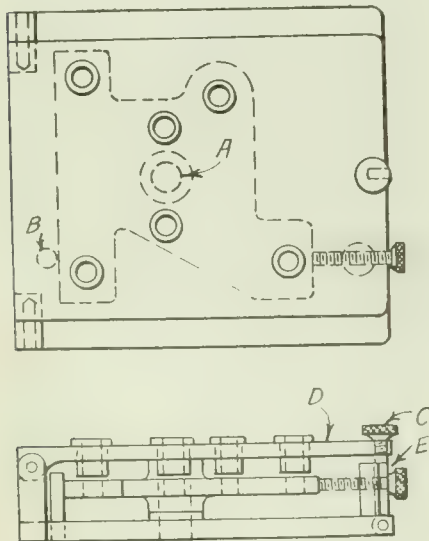


FIG. 2 JIG USED FOR DRILLING.

ous operation, and the bosses faced, we are concerned only with the remaining six holes to be machined.

The work is placed over the centering

pin "A", and made to hit the stop pin "B." Fastening screw with knurled handle "C" is brought up and holds the work securely in place. Swinging bushing plate "D" is dropped into position, and fastened with eye bolt "E," when work is ready to be drilled.

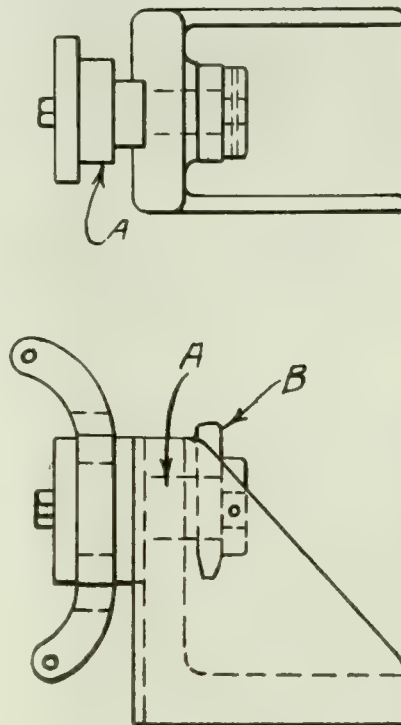
All holes are, of course, drilled at the one setting, and accuracy and interchangeability are assured.

TURNOVER MILLING JIG

By J. H. Moore

The turnover Milling Jig, as illustrated, was adopted to mill governor brackets on gasoline engine work, and has proved a huge success both as a labor saver and as a cost reducer.

The design is so simple that any explanation is hardly necessary except to say that the spindle portion A has a tongue which fits into a groove in the main body casting of jig, and in this



SIX-HOLE DRILL JIG.

way is held in position, aided by the wedge B.

Upon removing this wedge the spindle is pulled in an outward direction when tongue leaves the groove. Work is then revolved 180° and placed in groove as before.

This method ensures accuracy.

Where this operation cost 25c each before the jig was used the cost after the jig was installed was reduced to 7½c, which shows clearly the advantages derived.

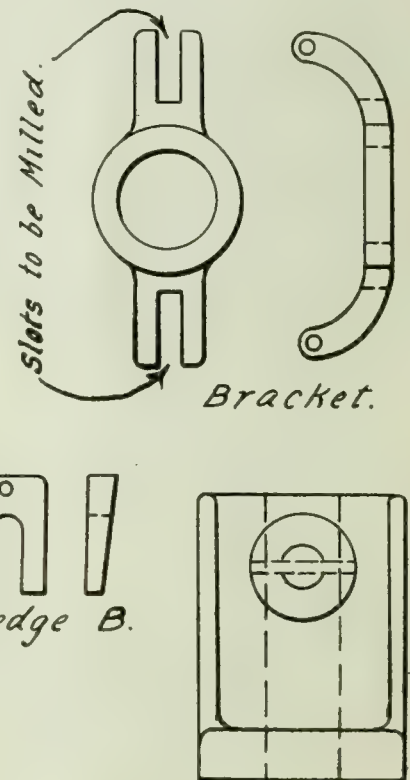
THE ESTIMATION OF ERRORS IN COAL ANALYSIS

In technical paper 171, recently issued by the Bureau of Mines, the authors, J. D. Davis and J. G. Fairchild, have sought to describe a definite method

for estimating the probable limits of error in analyzing samples of coal and to show how this method, that of least squares, should be applied.

It has been shown that the method of least squares is applicable to the problem of sampling coal; and the authors have succeeded in deriving direct expressions for the magnitude of the errors in the work studied, or in other words, the answer to: What is the magnitude of the probable error of a single determination, and what is the maximum error to be expected, say, once in 1,000 determinations?

The authors have attacked the problem by first carefully working out the limits for a few coals that are selected as typical and then comparing the results so obtained with data compiled from numerous check determinations taken consecutively from laboratory records.



The results obtained through the theory of probability would seem to indicate rather clearly what degree of precision may be expected with the coal analysis when the quantities are defined by the actual methods used for analysis. It would seem that the limits allowed by the committee on coal analysis of the American Society for Testing Materials are not limits outside which, with ordinary care, determinations would never fall; it would seem rather that the committee means to designate limits within which a large percentage of errors would fall.

The treatment of the subject, while highly mathematical, is of interest and is a welcome addition to the literature on coal analysis.



DEVELOPMENTS IN SHOP EQUIPMENT



Makers of equipment and devices for use in machine shop and metal working plants should submit descriptions and illustrations to Editorial Department for review in this section.

THE PRECISION MEASUREMENT OF THREAD GAUGES

FAR reaching advances have been made in the past few years in the precision measurement of gauges, etc., upon which the accuracy and interchangeability of the products of the modern machine shop depend for their usefulness. The National Physical Laboratory of Great Britain and latterly the Bureau of Standards of the United States have investigated the subject of thread gauges extensively, and as a result of their researches apparatus and methods have been developed for testing with a high degree of accuracy.

As might be expected, manufacturers of thread gauges have availed themselves of the facilities afforded them and have sent their gauges to the Bureau of Standards for testing, but it has only been recently that the equipment necessary has been made available for private use. The Arthur Knapp engineering Corporation, 101 Park Ave., New York, is now making commercial equipment similar to that developed by the Bureau of Standards, for the manufacturer who has sufficient work to render its purchase advisable.

When the demand for quantity production of threaded parts within the fine limits demanded in the shell industry first arose, it was seen that the measuring apparatus, then available, was inadequate to the task and the apparatus here illustrated was developed in the United States.

In the measuring of threads five distinct operations are necessary, the checking of pitch or lead, the measurement of form and angle of thread, the determining of the core diameter, the measuring

of the full diameter and the measurement of the effective diameter.

The apparatus shown in Fig. 1 is used to determine the form and angle of thread. Its operation involves the placing of the thread to be examined in a beam of parallel light, the beam from an electric arc lamp being used as it most nearly approaches a white light in quality. The light from the lamp "L" is directed by the condensing lens A onto the projecting lenses B and C. The screw plug to be tested is placed at the focus of the lens combination B C. Its image

housing which carries the condensing lens is pivoted about a point beneath the lens B. This insures that the beam of parallel light will always be directed at and will fill the lens B, and the shadow cast will be a true cross-section of the thread form when the proper adjustments are made.

The setting up of a thread gauge for examination requires but a slight amount of adjustment. The stand E is provided with a motion for raising and lowering the threads, a motion for focusing the thread, and another motion for

moving the thread along its axis in order that various portions of the thread may be brought into the centre of the screen. The screw to be examined is supported by spring centres which are carried on the stand E. For convenience in making observations it is raised until the centre of the beam of light is passing the under side of the thread. The lamp L is then turned about the axis of its support until the parallel rays of light emerging from the lens A pass through the helix angle. This is shown to be the case when the fringe pattern which is formed about the image of the screw due to imperfect focus is symmetrical. The screw is then brought into focus by a slow motion and the adjustments

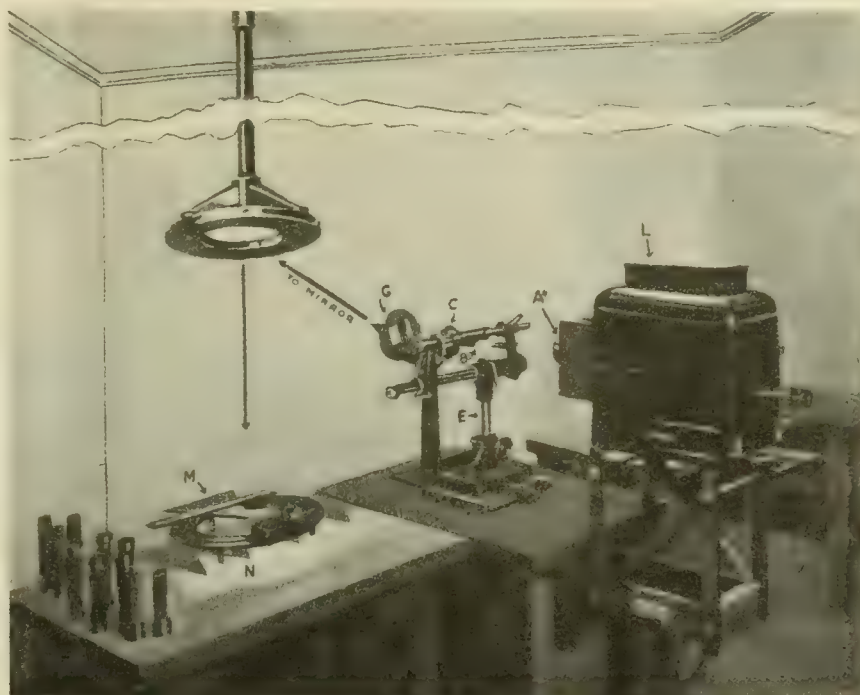


FIG. 1 THIS ANGLE PROJECTION APPARATUS IS OF THE TYPE DESIGNED BY THE BUREAU OF STANDARDS FOR THE EXAMINATION OF SCREW THREADS.

is then, by means of a prism G, projected upwards to a mirror carried in a rigid housing, and from the mirror is reflected downwards to the top of the stage N. A standard angle M is shown which is used in checking the wave form. It is necessary for true measurement that the beam of light from the lantern should pass through the screw plug in a direction parallel to the helix angle of the thread, and, therefore, the lamp

tion arrangement are complete.

The examination of the thread angle is made with the aid of a device shown in Fig. 2. The standard angle M known to be 60° is supported by three columns on the stand T, on which rests a protractor ring P carrying the standard angle and the straight-edge E. During the examination of the thread angle the standard angle is adjusted so that its

shadow occupies the light space of the projected image on the surface of the table below. The standard angle is revolved so that one side exactly matches the shadow of the thread and the reading of the graduated head is done by means of the magnifying glass R. The standard angle is then revolved until it

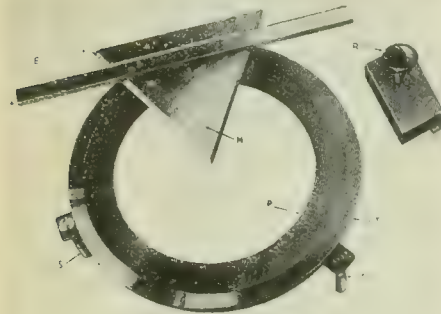


FIG. 2 BEVEL PROTRACTOR USED IN

coincides with the other side of the thread and a reading is again taken. The difference between the two readings gives the error of the thread directly. The protractor can be further used to determine whether the thread is symmetrical with D, a line perpendicular to the axis of the gauge being tested.

The use of the protractor results in a very high degree of accuracy being maintained. The eye is viewing two objects of similar character, two shadows and these can be made to approach until a faint, even thread of light remains between the two—an inaccuracy of only a few minutes can be easily detected. Photographic paper may be used where a permanent record is desired.

Equipments of this kind are made to provide for obtaining a magnification of either 44, 65, or 115 times actual size between the work and the face of the mirror; then by regulating the distance between the mirror and the stage N upon which the image is projected, a further degree of magnification can be obtained. The latter result must be calculated for the distance from the stage to the face of the projecting mirror. Tested under such conditions by a method where the personal equation is eliminated, it is obvious that extremely accurate results can be obtained.

The same equipment may be employed, however, for testing the accuracy of the thread form of female gauges. This result is accomplished by the use of a special core check composition with a known coefficient of contraction and expansion. With this composition a cast is made of a section of the internal thread and then after the cast has been hardened, the accuracy of the thread form of this cast is determined by setting it up on a special support on the gauge-holder and proceeding in exactly the same way as in testing the accuracy of a male-thread gauge. This projection apparatus is also adapted for accurately determining the perfection of thread form of such products as taps and

threading dies. It may also be used for testing the accuracy of master templets, etc.

For use in testing the accuracy of the lead of thread gauges, the Arthur Knapp Engineering Corporation is making an apparatus illustrated in Figs. 3 and 4. Its construction is based upon designs furnished to the Bureau of Standards, Washington, D.C., by the National Physical Laboratory of England. The illustrations show machines set up for testing a plug thread gauge and a ring thread gauge, respectively. In addition to its application for testing the lead of thread gauges, this apparatus may be used to advantage in checking the lead of taps, hobs, threading dies and other work of a similar nature, where accuracy of the lead is important. It will be seen that thread gauge X, which is to be tested, is supported between centres carried by a fixed frame L, these centres being adjustable to carry thread gauges of different lengths. A stylus A enters the thread groove, this stylus being carried by a spring support secured to carriage T which is free to move longitudinally. When such a movement of the carriage occurs, the stylus swings on its spring support about a fulcrum at the point of the stylus which is in contact with the thread groove. At its rear end, stylus A carries a small projection lens D through which the light is transmitted from a straight line filament F. The image of this incandescent filament passes through lens D and then by means of two suitable prisms located beneath the table, this image is projected up onto ground glass G. There is a

that the micrometer spindle is always held in contact with an accurately ground ball S at the rear end of the right-hand centre. In testing the accuracy of lead of a thread gauge with this apparatus, first set the gauge up between centres and then enter the stylus point into a thread groove, after which the image of the incandescent filament is brought into coincidence with the line scribed on ground glass G. When this result has been accomplished, the reading of the micrometer head is noted, after which the stylus point is withdrawn from the thread and placed in either the next thread groove or any known number of threads from the one in which the stylus was originally located. Before this change can be made, the micrometer head must be turned back so that the spindle is sufficiently released from the ball S to allow the required travel of carriage T. After setting the stylus in the required thread groove, the micrometer spindle is turned up into contact with ball S, and then by carefully turning the micrometer, a sufficient movement of carriage T will be accomplished to bring the image of the incandescent filament back into coincidence with the line on ground glass G. If the lead of the thread is accurate the difference in the micrometer readings between the first and second sittings will be equal to the lead of the thread or to some multiple of it.

The same apparatus is used in testing ring gauges, and an attachment is provided for this purpose. The set up for ring gauges is shown in Fig. 4 and consists of an auxiliary stylus E which has

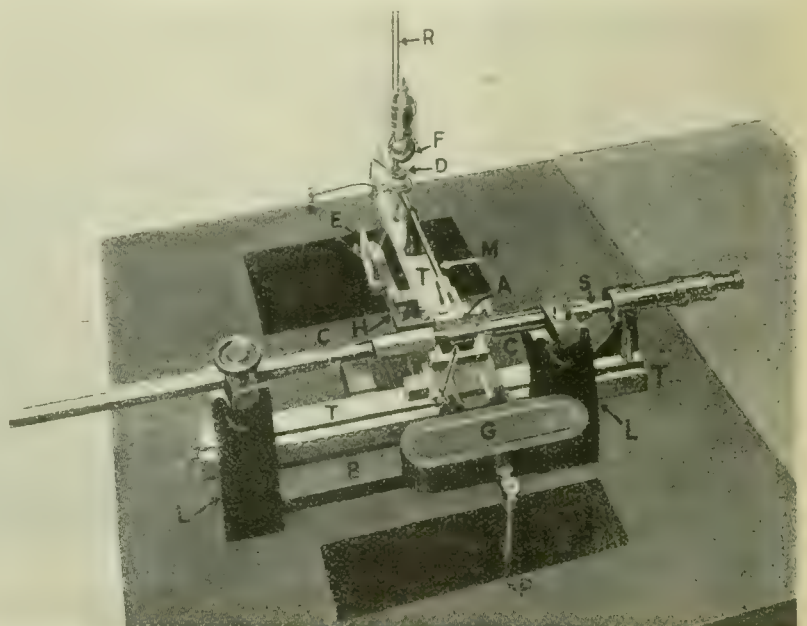


FIG. 3 OPTICAL LEAD TESTING APPARATUS SET UP FOR TESTING PLUG THREAD GAUGES.

line scribed on this ground glass with which the image of the filament may be brought into coincidence by moving carriage T.

Mounted at the right-hand end of carriage T there is a micrometer head which reads to 0.0001 inch and carriage T is controlled by a counterweight so

a bent point K which will enter the thread groove. Several sizes of style are provided to suit different pitches.

The pitch diameter of gauges is measured by a machine constructed by the above firm according to designs developed by the National Physical Laboratory of Great Britain.

Apparatus for Measuring Pitch Diameter of Thread Gauges

The thread gauge pitch diameter measuring machine shown in Fig. 5 is made by the Arthur Knapp Engineering Cor-

SMOOTHER SHIPS FOR SPEED

From the considerable amount of experience that has been obtained in England on the construction of steam and motor ships with electrically welded

out a welded ship which offers more advantages, structural and otherwise, than are obvious from a first consideration of the problem.

TURNING OUT MACHINE TO MAKE THE SNOW FLY

Goderich Firm Could Hardly Get Enough Snow to Give a Demonstration

The Dominion Road Machinery Co., Ltd., of Goderich, this winter are making six more of their rotary snow plows, which were put on the market last winter. Two of these machines were manufactured last winter and have been in successful operation in the city of Montreal, where they had some real drifts to contend with. The third machine to be manufactured gave an exhibition on the Square at Goderich before its shipment to Montreal, but as there was little snow, only a faint conception of what the machine can do was got by the spectators. The machine is drawn by horse power, but the motive power to operate the rotary blades is supplied by a 60 h.p. gasoline engine. The blades are in two sections, one at each side of the machine, and are made to rotate at a rapid speed in the opposite direction to that in which the machine is moving. In the centre of the machine is a sort of plow arrangement, which divides the drift, causing part to fall to each side in front of the blades. These throw the snow up at each side through a sort of funnel, either scattering it broadcast or dumping it on a sleigh driven alongside, according as the hood is raised or lowered. The machine costs up in the thousands, but for a city with much snow to remove it should prove a great money saver in the speed at which it can work. The selling agents are the Canadian Fairbanks Morse, Montreal.

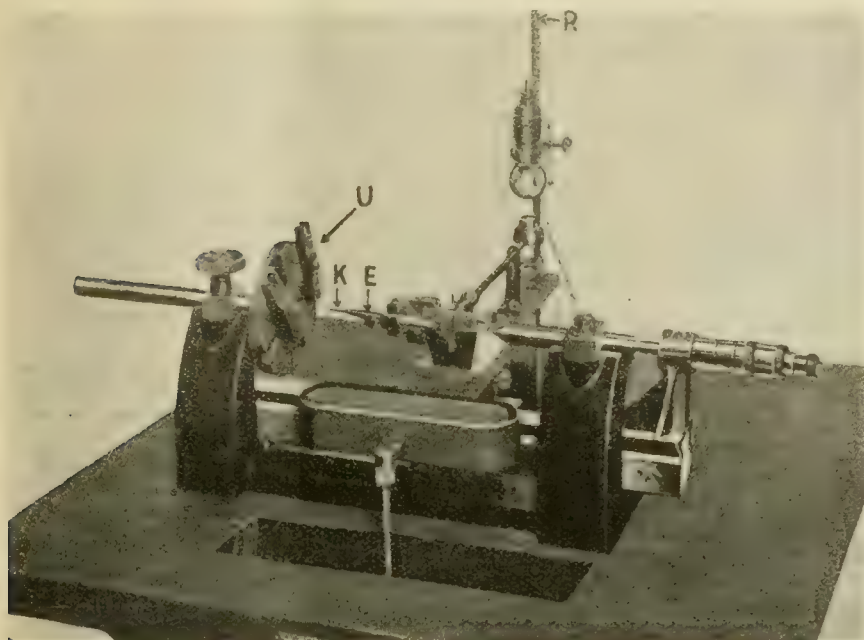


FIG. 4 MACHINE IN POSITION FOR TESTING RING THREAD GAUGES.

poration according to designs developed by the National Physical Laboratory of England. It will be apparent from this illustration that the apparatus employs the three-wire system and the claim made is that exceptional facility is afforded the operator of the machine in carrying on his work. It will be seen that the three wires A are supported by a bridge B so that they are conveniently located in relation to the gauge. This is a far better method than employing rubber bands to hold the wires on the work, as the tension of the bands bows the wires and is likely to cause inaccurate results to be secured. At one end of bridge B it will be seen that there is a stop C which is adjustable for different sizes of thread gauges which may be tested; and at the opposite end of the bridge there is a micrometer head D which is used in making the measurement over the wires. The entire bridge and other parts of the mechanism are carried on a cross-slide E, which is supported by two balls in one of the V-ways and one ball in the third way. This gives a free transverse movement so that the stop C and micrometer spindle D can instantly centre themselves in relation to the thread gauge and wires. It will also be seen that carriage E is mounted on a longitudinal slide F so that the micrometer and wires may be moved along to provide for taking measurements at different points on the thread gauge. It will, of course, be evident that the gauge is supported on centres G and that these are furnished with means of adjustment to provide for holding thread gauges of various lengths.

joint there is every reason to believe that welding will become one of the standard processes in shipbuilding. By the elimination of rivets and riveting much material and a great deal of costly and tedious labor are saved. The welded ship being lighter and having a smooth skin, can carry more cargo and make higher speed than a vessel with riveted joints. The welded joint can be made much superior to the riveted joint in compactness and strength. At present it would not be wise to have a welded vessel built by other than a firm of the highest repute, but there is no doubt that a first class shipbuilder, using all the resources at his disposal, can turn

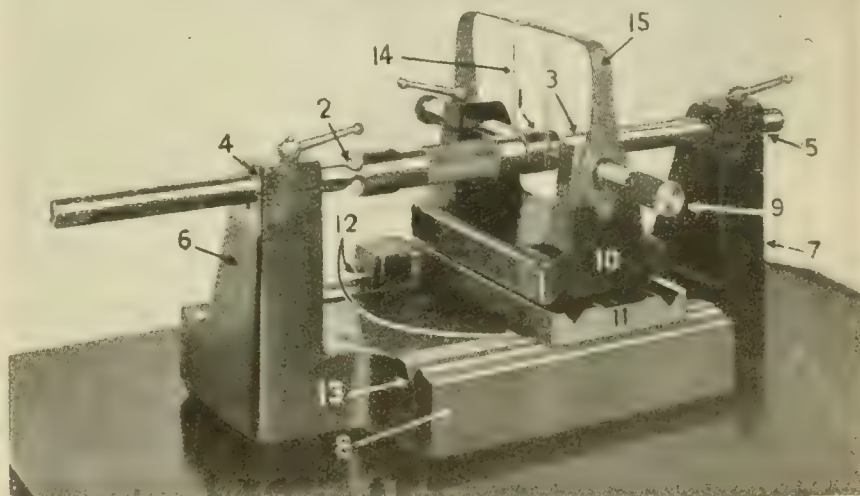


FIG. 5 PITCH DIAMETER MEASURING MACHINE.

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That European Business

THE much talked-of trade with Europe has not as yet materialized. It is becoming more evident daily that "the reconstruction of devastated Europe" is being attended to in a good many particulars by "devastated Europe" itself. The Ottawa representative of CANADIAN MACHINERY, in a recent despatch, puts it this way:—

"It begins to look as though our reconstruction trade with Europe, which was started after with considerable of a hurrah when the war ended, would not be something that would drop into the lap of Canada without effort, and a great deal of effort, at that. Our Trade Commission has now been in Europe for two months; reconstruction there has, presumably, been going on; but at the time of writing not a single definite order has come our way. It seems that the announcement of a forty-million-dollar order for lumber was premature; there is, at all events, a good deal of uncertainty about it still, and the impression here appears to be that all that was done was the establishing of a credit for that amount for the purchase of lumber. Norway and the other timber countries of Europe are after the business; and a Frenchman's business goes to the lowest bidder.

"Apparently the most we can expect from the Trade Commission is to locate business abroad in a general way, and advise Canada of its whereabouts. Orders will have to be secured by personal effort on the part of our manufacturers. The United States is going to compete with us for every dollar of it; and they have a competitive organization now on the ground.

"The American army was spread over a good deal more ground in France than the British, and probably came into closer touch with the people. The American is a good mixer. The study of French has been encouraged among American soldiers. American business methods applied to war were more spectacular, if no more effective, than our own."

It stands to reason that the nations of Europe, even those that have been overrun by war, are not going to stand back and see business going elsewhere that they can possibly handle. They will have their own people to look after, and the problems of unemployment will be just as keen in those countries as in the others that are there looking for business.

If Canadian manufacturers, separately or in groups, can send representatives to locate and LAND business, it would be good policy for them to do it. In the past Ottawa has not shown itself to be a prolific source of business for the Canadian shop, and it may not be well to rely too much on it now.

A Poor Way To Do Business

IN Toronto police court a few days ago six boys were arraigned in the criminal dock on the charge of having played cards on Sunday in some shop or factory.

The boys were gathered in by the police net on Sunday and locked up in the cells over night.

They were treated, to all intents and purposes, as though they were criminals.

Boys who play cards on Sunday, or any other day for that matter, for stakes or for amusement are not necessarily bad.

Putting them in police court over night is not going to make them any better.

The chances are that those boys are standing right at the point where they need a little care from a good man and a little love from a good, motherly woman.

It's worth asking whether the law is to protect, punish or improve. In the case of these boys if it does nothing more than accomplish the first two, it has failed and failed miserably.

Toronto has many institutions that claim to make a specialty of giving boys a second chance and a better start. Here's a chance for some of the theories to be put into actual practice.

The police court as an institution for dealing with boys who haven't had a good start has never shown itself to be a success, and it's a serious mistake and a poor blunder as well to herd boys behind the bars as a starter.

Prices After War Periods

ANYTHING that has a bearing on prices is a matter of interest right now. Eliot A. Kebler, special representative at Pittsburgh of the Matthew Addy Co., has sent to Judge E. H. Gary, chairman United States Steel Corporation, the following statement as to pig iron prices after wars and shortage of pig iron capacity shown by comparison with steel:

ADVANCE IN PIG IRON PRICES AFTER WAR

Russian-Japanese War

War declared Feb. 10 1904—Valley Bessemer	\$12.64
War ended Sept. 9, 1905—Valley Bessemer	14.95
Price May, 1907—Valley Bessemer	23.28

Spanish War

Really began January, 1898—Valley Bessemer	\$ 9.12
War declared April, 1898—Valley Bessemer	9.66
War ended August, 1898—Valley Bessemer	9.60
Price December, 1900—Valley Bessemer	24.20

Franco-Prussian

War declared July 10, 1870—No. 1 foundry, Philadelphia	\$32.75
War ended May, 1871—No. 1 foundry, Philadelphia	35.50
Price June, 1872—No. 1 foundry, Philadelphia	53.37

Civil War

October, 1862—No. 1 foundry, Philadelphia	\$18.61
August, 1864—No. 1 foundry, Philadelphia (gold basis)	29.44
Average year 1866—No. 1 foundry, Philadelphia	46.67

Of course it is possible to advance all sorts of reasons why the same thing should not work out the same way in the present situation, but against this there is the weight of precedent worked out in cold figures. The record of past performance is worth remembering when making your future plans.

THE pork packers are bustin' out in cold sweats because the price of pork is apt to come down to the point where we can once more decorate the pine table with ham and—

* * *

A WIDOWER is advertising in a Toronto paper, stating that he wants to meet a widow who has some means of her own. That's our idea of a real optimistic optimist.

* * *

THE scrap business has gone to pieces. The first man to spoil the business was the Hun with his scrap of paper. Now the scrap in Europe has petered out and the scrap metal market here is a dead one.

* * *

SOME experts say that the era of lower food and clothing prices is on the way. So be it. Perhaps we'll soon be buying tan boots for \$2 a toss and gettin' T-bone steaks for a yolk shillin'.

Don't Pursue Waiting Policy Too Long

IT is now approaching three months since the signing of the armistice was announced that ended the European war. This act made it certain that the Allies—Canada included—were free to work out their own destinies without the fear of German domination.

That fear of German domination is being replaced in some quarters with a new fear—one that might be called the fear that we can't do things.

It is time for governments and manufacturers to look this situation right square in the face and find out what's the matter with us.

Let us admit that there is a certain element of risk in driving ahead right now with an industrial proposition. Any good business man knows that, and it's not worth while arguing the point.

There was also a certain amount of risk for the man who stood in the front line on that Western Front to keep German from being made the court language of Canada.

Is it a greater thing to ask a man to risk his dollars now than it was to ask and in some cases make a man risk his life a few months ago?

There's nothing particularly radical about that question. It's a plain statement of absolute fact.

And while some of our men were being shot at on the Western Front others were making money at home. Nor were they making it in hundreds or thousands. They were making it in millions.

These brave chaps are coming back now. Every week sees them landing here in thousands. They are desirous in nearly every case of getting their discharge. They want to return to their old lines. They want to work and earn their living.

As things are shaping at the present moment it looks as though many of them would find that the country that cheered their departure would now cheer them back to a jobless land.

Enterprises are held up in many cases on the expectation of lower prices farther on. Manufacturers hesitate to buy material out of a fairly high market, fearing that before they have finished their operations and distributed the product through their selling agencies, prices will have moved to a lower level, and they will lose money on the venture.

Well, supposing this feeling becomes general, and that this motive becomes the one dominant tone that is going to regulate business. What is going to be the result?

Again, there is hardly any need for answering that question, because the answer is painfully apparent to any person who cares to give any thought to the matter at all.

It spells stagnation in letters a foot high.

It would not be worth noticing were this policy

being put into effect in only a few isolated cases, but when the industrial fabric becomes saturated with that same idea, it is high time to speak and find a solution.

Firms that have made money should, in fairness to the abnormal conditions that made it possible for them to make it in large quantities, be willing to risk some of it to bridge over the uncertain months that lie between an abundant war trade and a normal peace-time turnover.

The Dominion Government, which right now has available cash at its disposal, and which can secure more, should place all the orders it can for all the enterprises it controls.

The individual buyer should get the idea out of his head that the purchase he is figuring on is going to be made at a greatly reduced price in a few months from now. It may pay him to wait. Admit that. But what is going to become of the good home market in which he expects to sell if all purchasers take the same stand?

Remember we do not for a moment recommend blindfolded spending. Such a policy would simply aggravate the situation, and make matters worse.

But there must come a time very soon when we should be entitled to look for a display of courage and confidence on the part of our industrial community. There is a danger of the country sitting down on its haunches too long.

It is time that the commercial and industrial world in Canada began to stick up the sign "Buy Something."

Remember this country is in good shape financially. The banks have a lot of money on deposit. Farmers have money and prices for their produce are good.

We haven't suffered property loss through the ravages of war. As a nation we are richer than before the war started. The end of the war made it certain that the sacrifices and achievements of our men in khaki had not been in vain.

We'll admit that it is easy to sit down and blow in the other fellow's money on paper. But that's not the point.

The thing is this: Industrial Canada, in self defence must soon see to it that we do not drift into an era of unemployment and social unrest. Just now when men are being discharged from the army in large numbers is the season when employment should be provided to take care of them. It would be much better for this rich country to invest some of its millions in this way than to spend them later on combatting some of the seed of unrest that will certainly be planted if this policy of waiting be allowed to continue indefinitely.



MARKET DEVELOPMENTS



More Sales Are Being Reported This Week

Some Revival Noticed in Certain Lines of Trade—If U.S. Mills Are Running Past 60 or 70 Per Cent., Where is the Output Going?
—Pig Iron Prices Are Not Finally Settled

THERE are some signs of an improvement in business conditions in so far as they have to do with the machine tool trade, but these are rather local, and can hardly be interpreted as forerunners of a general revival in this line of business. However, there are lines that are buying quite heavily, viz., some of the agricultural implement shops, rubber goods works, knitting mills, planing mills and furniture factories.

It is interesting to note as an aftermath of the war that British lines are making their appearance once more on the Canadian market. This week a good sized tube order went to a British house. They are also in the market now for furnaces, chains, anchors, and kindred lines. Exportation of these was prohibited during the war, but it is possible now, and there are increasing facilities for transportation as well.

Warehouse interests report that there is a lot of business moving in their lines. It is not coming from

any particular section, but from shipyards, mines, and repair requirements to existing plants. Some of the latter have been run at top speed 24 hours a day for the last three years, and it is easy to see that they need repairs.

The Canadian National Railways are out this week with specifications for satisfactory orders for tubes, plate, etc., for boiler work. In fact, their buying of this material and of supplies for the machine shops has been about the best business offering.

Prices of steel are standing at the marks that have been passing for some weeks. Indications are that they will not move to any lower levels. There is talk of labor trouble breaking out in the Pittsburgh district, and it will be largely through prices that such trouble will come. The trade feels that it cannot keep prices up to levels and get trade, nor can prices drop until production costs are cut. In such circumstances it is not a hard matter to create trouble.

MONTREAL TRADE CONDITIONS ARE NOT RECOVERING QUICKLY

Special to CANADIAN MACHINERY

MONTREAL, January 29. — Nothing has transpired that would give an indication of an early renewal of industrial activity. After the four strenuous years of war even normal conditions seem quiet in comparison, and during the period of readjustment this absence of activity will be more pronounced than ordinarily. A factor that is affecting present business is the high costs of production, chiefly as a result of the high wages paid to workmen. The readjustment in this connection will be one of the most difficult tasks of officials in placing operations on a more normal basis. In ordinary times production could be maintained to relieve a serious labor situation, but existing high costs in the face of a lowering market almost prohibits the accumulation of stocks. It is hoped that the Government will take steps to relieve a situation that may gradually become worse.

No Market in Steel

Despite the fact that price declines are relatively few, the situation is gradually attaining the point where some de-

finite action will probably be taken to free the market from its strained position. With the present reduced production far exceeding the trade requirements the surplus output must eventually create stocks that may have to be sacrificed in the early future. A further reduction on present production will mean the closing down of mills and resulting in the addition to the already large numbers of unemployed labor. Even should prices decline to a more normal basis it is doubtful if heavy buying would immediately develop owing to the marked uncertainty that prevails in all circles. It is not unlikely, however, that with the peace negotiations assuming tangible shape business activity will be resumed. At present it would appear that every one is waiting to see what the other is going to do, few having the courage to strike out for themselves. Dealers report a quiet demand but consider the volume of fair proportion in face of existing conditions. The bulk of the business now passing is almost exclusively for immediate requirements, little interest being displayed regarding future needs.

Weakness in Metals

Price quotations on the various metals are gradually declining, but activity fails to develop under the existing unsettled conditions. Production and supply is more than sufficient for present requirements, and unless buying on a larger scale becomes a feature of early future business prices are more than likely to go still lower. Local demand is very quiet, but business in some lines is fairly steady. Dealers here announce a decline of one cent on coppers, the quotations being 25 and 26 cents per pound. Tin requirements are comparatively light and the price asked is 70 cents, a drop of 5 cents per pound. Lead is weaker on poor demand, a decline of ½ cent, placing this week's quotation at 8½ cents per pound. The demand for aluminum has fallen off and quotations have declined to 40 cents per pound.

Machine Tools Still Quiet

General business in machine tools continues quiet but present inquiry is of a character that would tend to indicate that buying will develop when conditions become more settled. Just now there is little interest displayed on the part of metal-working shops, but demand for wood-working tools is relatively heavy. Some second-hand machines are being disposed of but these are invariably

those that are applicable to general use. Special shell machines are not occupying the attention of the dealers to any great extent. While dealers here invariably report a quiet week, it was stated by one that their sales for the month so far exceeded those of December and the turnover on small tools and supplies was exceptionally good under existing circumstances. One machine agency here stated that a sale had been made a few days ago in which he disposed of a hydraulic forging press from one Montreal firm to another for the sum of \$17,000, the purchaser already being in possession of two of the largest forging plants in the city. Future industrial prospects are still more or less obscure, and until the veil of uncertainty is lifted the outlook for renewed buying is a doubtful factor. Present prices are still comparatively high and this is probably one of the conditions that influences current buying.

Scrap Very Dull

Stagnation characterizes the scrap and old material situation and present developments are little indication of a departure from these conditions. Dealers claim that large consumers are heavily stocked and consumption is light. Yards are well supplied and many dealers are reluctant to take any additional scrap when the same is offered unless a purchaser can be found for the same to permit of its transfer direct. Price quotations are nominal and can only serve as a basis of the market, as dealers claim they cannot give any definite price for the purchase of material, each transaction being conducted on its own merits. The quoted price on wrought iron axles is now \$28, machine cast iron \$28, malleable scrap \$23, and wrought iron pipe \$16, these prices representing a decline of \$2 per ton.

REPORT SALES AS SHOWING GAINS NOW

Dealers in Several Lines Are Sure That Things Are Turning Out Better

TORONTO.—There are indications coming to the surface that show that business is improving. Sales are reported in a good many cases, and some of them run into very respectable looking figures. It cannot be said that these are along any particular line, but come from a great diversity of interests. In some cases they are orders that could not be placed during the war, because manufacture of the machinery would not be allowed in any of the Allied countries, while in others shipment was much interfered with. Many of the dealers expressed themselves as much more satisfied with the outlook than they have for some weeks past.

No Better—No Worse

"Just the same as last week. Not a bit better and not a bit worse." That seems to fairly well describe the market for second-hand material just now. Dealers find help—as least they say they do—

POINTS IN WEEK'S MARKETING NOTES

The claim is made that production is greater than 70 per cent. of the steel mill capacity of United States at present. If this is so a Pittsburgh expert wants to know where the material is going.

There is some serious talk of labor trouble in the Pittsburgh district. Present selling prices do not draw business, and it is impossible to get lower unless labor costs come down. It is said that some shops are preparing against labor troubles.

Several fairly large sales have been made in Toronto during the week in the line of machinery. Some of the agricultural shops are in the market while others are contemplating purchases.

There is a nice amount of material going to the shipyards now and business there promises to be good for some months to come.

There have been no price reductions during the week and it looks as though present values would stand for some time.

The scrap metal market is no better. Neither is it any worse. Some of the larger yards claim to be losing money now, but contend that the present situation cannot last indefinitely. There is nothing in sight to indicate any betterment in the near future.

United States dealers are divided on the price of pig iron. The new price named by Judge Gary was \$31 against the war price of \$34. Some of the independents are holding out for the old price. There is very little selling beyond actual needs being done at either price.

in the thought that the present situation can't last indefinitely, and that sooner or later things will begin to move. "It's about the same as the first six weeks of the war," stated one dealer to CANADIAN MACHINERY this morning. "We are not doing a thing in our yards. In fact we are losing money now, but it can't last much longer."

There has been small lots of shell shop machinery come into the hands of the scrap dealers, and several more deals are pending now. This class of material would come under the heading of "Breakage," and \$18 per ton would be about the market price for it now. That is rather low, but dealers would probably buy at that figure now, and the chances are that they could not be coaxed into going higher for the material in the pre-

sent market. It is a mixture of cast iron and steel and would have to be separated and broken up into sizes to suit the cupola. It seems likely that there will be considerable of this sort of material offering before so very long, and unless the market changes for the better the returns from such sales will not be very heavy.

Scrap prices are not particularly high now if they are taken against a ten-year period in pre-war times. For instance heavy melting is now quoted at \$15, which is away down from the prices that it has been bringing for a good many months past, but shortly before the outbreak of the war there were sales made as low as \$9.25 per ton. However it would not be fair to put that up as normal price, as it was in reality an abnormally low price.

English Lines in Again

One thing is worth noticing as an after-war development, and that is that British lines are again coming into the Canadian market in several instances. During the war it was impossible for the Old Country firms to compete here. They could not secure permission to export such articles as tubes, chains, furnaces, nautical instruments, etc., neither was it possible to secure the shipping accommodation to bring it to this country. There was one good sized order figured on during the last few days by representatives of English firms for boiler tubes. There does not seem to be much uniformity about the price as in the bid for plain tubes the English price was away high, but on stay tubes they were well below the quotations of the American mills.

The Canadian National Railway is out again with some very nice inquiries for good amounts of tubing, plate, etc. Warehouse men here state that there is a very nice volume of business moving. They cannot place their finger on any particular spot and say that it is the source of their turnover, but it is a fact that they are receiving inquiries that are readily converted, from a great many different interests. Some of them are for repairs on a large scale, while others are for new work. Shipyards are also good customers for steel plate, and their orders are still proving quite a tonnage. Deliveries on this material are much better than they were some months ago.

Supplies Are Firm

An agent of one of the leading makers of drills, speaking to CANADIAN MACHINERY this week, stated that there were going to be no reductions in prices. He claimed the contracts for the raw materials were made pretty well in advance, and as this was being worked up into stock there was no chance of a decline in prices. Some of the interests seem to have been anticipating that there would be a drop, but this representative was certain that such would not be the case. In fact he said his company had already considered the matter, and he knew what their policy was going to be.

Selling Machine Tools

"Business is a long long way from being dead," was the remark of a Toronto dealer this week. He admitted that the equipment of the flying corps shops that was being placed on the market was interfering with the sale of new machinery in some cases, but apart from that there is business going. The agricultural implement houses are buying heavily in some cases. In fact there seems to be a difference of policy here. One large shop is buying equipment in big quantities just now, while others, which do business on a

large scale, are pursuing a very conservative policy, and are not placing any orders that they do not immediately need.

Dealers are selling machinery to wood-working shops and furniture factories. Knitting factories are also good customers. Many of these lines have of necessity been neglected during the period of the war, and they are coming back now at the first opportunity. Shops that are making rubber goods are also in the market in many cases for machinery, in fact the demand in this class seems to be particularly brisk.

mill is the actual tonnage output divided by the tonnage of which the mill is capable. A plant may report that it is "operating in full," however, when it merely has all departments in operation. Thus a plant containing ten open-hearth furnaces might be operating each of the ten, but by using a minimum of scrap, the charge being chiefly pig iron, might be getting only ten heats per week, whereas when production is pushed the furnaces might be capable of 16 heats per week. This would be "full operation" in one sense but only 62½ per cent. operation from the tonnage standpoint.

Whatever the rate of operation, it has been decreasing since just before Christmas, and the present trend is downwards, as the orders coming in are far less than the orders that are being filled. The mills are running chiefly on old orders, and most of them frankly admit that they could not come anyway near operating at their present rate, whatever that rate may be, if they depended solely upon current bookings of business. Obviously the old orders will tend to play out from week to week, and smaller and smaller production is in prospect, until there is a fundamental change in conditions.

Production in Detail

For several weeks past the report has been quite general that the sheet mills were experiencing about the best operation of any branch of the finished steel trade. If that were true at one time it is no longer true, for sheet mill operations have decreased materially. Several plants closed entirely at the end of last week, and one plant containing about ten mills is to close at the end of last week, having practically no further orders on hand. While sheet demand from the automobile trade is excellent the heaviest tonnage the automobile shops can take is but a small proportion of the total sheet capacity. To make a full demand for sheets it is necessary that there be a fair degree of building activity, but there is practically none at all.

The wire mills are doing fairly well, the majority at 60 to 70 per cent. of their respective capacities. Their trade prospects are fairly good, moreover. The wire mills are much less dependent on the building trades for orders than are some other branches of the finished steel trade. They look rather to the farmer, who has great consumptive powers in wire of various descriptions, and nails. In merchant bars there is a fair degree of activity, and this is true also of pipe. The structural mills are running very light, while there is hardly any rail production at all.

The plate situation is rather cloudy. Several plate producing interests claim to be operating quite well, but refer to orders from the Emergency Fleet Corporation as their chief business. From the shipyards, however, come complaints of overshipments, and the Fleet Corporation's orders, recently curtailed from the rate obtaining in the late months of the war may, therefore, be further curtailed. At their highest level, the Fleet Corporation's plate requirements repre-

THE QUESTION OF PRICE KEEPS BOBBING UP IN PIG IRON DEALS

THE question of the price of pig iron is one of the matters that is holding the attention of American trade. The new price of \$31 is not yet fully established, but is making rapid progress, and sellers find that they have to come to that figure in order to compete with those who are making the \$3 concession.

Pittsburgh.—Disquieting reports are in circulation here to the effect that a strike may be called in several of the mills to head off a cut in wages. The market is extremely dull, and the only sales being made are in cases where there is immediate need. Quite a number of furnaces in this district have blown out for relining and repairs. Of course, this means that the record for output will fall down when compared to the previous month.

Chicago.—One of the largest producers and sellers has issued the following statement: "We understand that the market price of pig iron has fallen about \$3 per ton. We followed the market and reduced prices on pig iron sold by us about \$3 per ton. In view of the peculiar commercial conditions now prevailing, we have applied this reduction on some existing contracts where the circumstances seemed to warrant."

Philadelphia.—Although some contractors have revised prices down \$3 per ton, some are still arguing the point with

their customers. Price revision is certainly becoming more general, and concessions to the trade will be more frequent. Lower prices are expected. The cutting down of costs, the sellers say, must happen before any reduction is possible now.

Buffalo.—A little demand for foundry, malleable and basic grades is developing, and this has the effect of making the outlook for business a little better, though no great improvement is noticed yet. Sellers are not out looking for business, but are cleaning up on contracts that have been on the books for some time.

Birmingham.—Some sales are now passing at the \$31 mark. On the other hand independent makers are selling at \$34 and getting a little business. Several small users are trying to get out of contracts unless they can get the \$31 figure.

New York.—Some of the reports from the East are a little better. A few foundries that are working on malleable are securing some orders from railroad and automobile business. Small export bookings are also secured.

St. Louis.—There has been practically no change here during the week. Buyers do not show any tendency to come into the market. They have enough on hand for their immediate needs.

IF MILLS ARE RUNNING NEARLY FULL, WHERE IS PRODUCT GOING?

Special to CANADIAN MACHINERY

PITTSBURGH, Pa., Jan. 30.—Some of the mills claim that the majority of current estimates of the average rate at which mills are operating are too low, the usual estimates ranging from 60 to 70 per cent. of capacity. If the contention of these mills is correct, a mystery is created, for it is recognized everywhere that there is no market for a tonnage of steel at all approaching the productive capacity. If the present demand for steel is really absorbing an output almost equal to capacity, then if a general widespread demand for steel should develop the mills would simply be swamped. No one, however, would contend that this

could occur, for throughout the steel trade, even among the more optimistic, doubts have arisen as to whether the steel industry can be fully supplied with orders even if business generally becomes good.

The mills could probably explain the discrepancy in reports if they would, but they are not any too communicative just now, feeling that the present is a very delicate situation. Possibly the explanation of there being such divergent reports as to the rate of operation is varying interpretation of the terms used in referring to operating rates. The common view of rate of operation of a steel

sented a tonnage equal to only five or six per cent. of the total finished steel capacity of the country, and not even one-half of the plate rolling capacity alone.

Prices

So far as can be ascertained, finished steel prices are holding very firmly. Mills, however, do not feel that it is any great trick to hold prices in present circumstances, because orders offered are very small and there is no temptation to cut prices in order to get the orders. Cut prices, indeed, might frighten away what little buying there is. One delicate point in the matter of price guarantees. Many buyers ask mills to guarantee prices to date of shipment, and although shipment as a rule would be made in from two to four weeks the mills refuse to give any guarantee. In this they feel they are exhibiting some strength, but buyers assert that this shows the mills have no confidence in their market.

For a short time after the reductions made about the middle of December, \$4 to \$6 a net ton under the former government maximums, there were predictions that the new prices would hold for

quite a while, say to April 1. In the past few days less confidence has been manifested on this head, and there are some predictions that there will be further declines in February, without detriment to there being also some reductions about April 1.

Labor and Wages

There is not much idleness of labor in the Pittsburgh district, not as much as in some sections of the East, but there is some, and additional men are being let off from day to day, chiefly common labor. The branch of the United States employment service located in Pittsburgh reports a large surplus of common labor, but an actual shortage of all-round skilled machinists, not the kind of "machinists" that were produced during the war, however. The policy of the steel mills continues to be that there should be no reduction in wages in present circumstances, and none at all unless prices should come down very considerably. In some quarters the prediction is made that after about two more reductions in prices of finished steel labor will be asked to bear part of the burden of further price declines.

SCOTIA COMPANY MAY CLOSE PART TO MAKE IMPROVEMENTS

NEW GLASGOW.—Asked as to the truth of the rumors that the Scotia Company contemplated the closing down of its steel making department of Sydney Mines, and the curtailment of its operations at New Glasgow, Mr. McDougall, president of the Nova Scotia Steel & Coal, stated that as was well known the several plants of the company had, during the past four years, been operated at high pressure. The present moment, when the cancellation of munitions contracts has left the tonnage on the company's order books at a lower point than at any time during the past four years, is considered an excellent opportunity for carrying out necessary repairs and renewals, which could not be done during the strenuous years when all efforts were bent on increased production without consideration of cost.

New business, said Mr. McDougall, is offered to a very limited extent and at prices which are not at present attractive to the Scotia Company, consequently now is the time to make the necessary preparations for the future. With this in view certain extensions of plant, which have been contemplated for some time, will also be planned and undertaken where possible during the shut-down.

The Coal Situation

What to do with its coal operations at Sydney Mines is the most difficult and complex question in connection with the Scotia Company. The cost of production at the collieries has for some time past been extremely high, making it impossible for the Scotia Company to compete in the general coal markets, and

seriously affecting the fuel costs in iron and steel production.

We hope, however, to effect such improved general policy of operation and engineering that the Scotia Company will, in the near future, resume its position in the general coal market and will obtain coal for steel making at a cost which will enable it to meet the competition.

Above ground our plans contemplate reconstruction, chief among which will be the provision of new and thoroughly up-to-date by-product coking ovens.

The situation at New Glasgow is more difficult to determine and will require considerable additional thought. In so far as is possible it is our hope and intention to maintain and develop the steel manufacturing industry in all its departments in Nova Scotia on a successful and steadily growing basis.

Developments at Wabana

It is at Wabana, however, that the company is likely to make its most important progress in the near future. During the world war shipping conditions were such that the former trade carried on by the Scotia Company will produce iron ore for disappeared entirely. The development of the property was pushed forward during this period and it is my idea to so develop the Wabana Mines that the Scotia Company will produce iron ore far in excess of its former outputs, and at materially reduced costs. The company will then be in a position to enter the ore markets of the world on a scale commensurate with its vast resources of iron ore.

Considerable time and capital will be

required for these plans and developments to mature. Fortunately, the probability of these developments was foreseen by the management and by Hayden, Stone & Company, who represent the large U. S. interests in this company, and through the fortunate provision of an additional \$5,000,000 of working capital by the sale of that amount of stock in the year 1917, the company is now placed in a remarkably strong financial position, having net current assets of over \$10,000,000.00.

WANT ASSISTANCE FOR STANDARDIZATION

Appeal Made to Ottawa For Assistance In Carrying Out This Work

OTTAWA.—A Government grant to help carry on the work of the Canadian Engineering Standards Committee and Government action to keep alive the airplane industry in the country were asked in memoranda which a deputation presented to Sir Thomas White, the Acting Prime Minister. The Engineering Standards Committee was formed a year ago as a result of a suggestion from the British Engineering Standards Association. The committee's object is to promote standardization of materials and machine parts with a view to expediting production, eliminating waste and reducing manufacturing costs. It received from the Government, through the honorary Advisory Council for Industrial and Scientific Research last year, a grant of \$3,000, which was supplemented by an equal sum contributed by technical societies and manufacturers interested in bringing about standardization of materials and interchangeability of parts. The committee now proposes to be incorporated as the Canadian Engineering Standards Association. It estimates that it will require from \$15,000 to \$20,000 for its work during the present year, and of that amount is asking the Government to contribute \$10,000. The committee has sub-committees on cement, bridge construction, materials, electrical standards, rails and other railway material, etc.

ROSS RIFLE WAS FINE FOR SNIPING

But Soldiers Preferred the Lee-Enfield For Hard Usage in the Trenches

It was unanimously decided at a meeting at the Windsor Hotel in Montreal of officers and other ranks interested in rifle shooting that the Montreal district should be represented at the meeting of the Dominion Rifle Association this year, and that a meeting should be held both for the Dominion and the Province. It was also decided by a strong majority vote that if the National Rifle Association should hold a meet at Bisley this year there should be the usual Canadian team of twenty members, probably ten from Canada and ten from the Canadian

overseas forces, with an adjutant to be appointed later. In argument as to whether the Ross or the Lee-Enfield rifle should be used, returned soldiers at the meeting all declared emphatically that the Canadian soldiers had thrown away

the Ross rifle and secured Lee-Enfields whenever they could, finding the latter the best when it came to hard fighting, although the Ross was a fine rifle for sniping. A vote taken, however, showed a majority in favor of the Ross rifle.

AMERICAN METHODS IN FOREIGN TRADE

In a book of the above title recently published by the McGraw Hill Book Co., New York, the author, George C. Vedder, has written a guide to export selling policy. While the subject matter pertains largely to American conditions and manufacturers, it is of particular interest to the Canadian manufacturer at the present time, for the sound business methods outlined are applicable to the Canadian trade as well.

Facts are presented which have been gathered by constant association with successful exporting manufacturers, foreign sales managers, general exporters, and overseas buyers. The fundamental weakness of the German trade policy or Cartel system is pointed out, and the writer ventures the prediction that it will be recognized that the World War was precipitated by the German Government's realization that the inevitable decline of a world trade, built up to serve abnormal and selfish aims, was impending, or already begun. The German manufacturer looked after his co-workers because they were necessary to his country's aims, but that enlightened selfishness which recognizes distributors as co-partners and satisfied customers as the greatest of business assets, was never one of his characteristics.

The danger of allowing the national Government of a country to constitute itself an agency for doing the things which a manufacturer should, and must do for himself, is pointed out, and the dangers inherent in recent legislation carried into effect in the United States, which virtually permits combines in the securing of foreign trade is set forth.

Coming to the matters of more immediate interest to the manufacturer, the means whereby foreign trade may be secured are clearly set forth, and the first of these, the export commission house, is described at some length. The advantages resulting from the securing of an exclusive export agent are set forth and certain drawbacks are pointed out. The requirements of a successful export manager who has charge of this branch of a manufacturer's activities are given and features taken up are general merchandising, making a start in direct exporting, the use of circulars and export catalogues, the salesman in foreign trade and co-operation with foreign agents. Foreign credits are described and pitfalls to be avoided are pointed out. Several chapters treat of the handling of foreign correspondence, heavy machinery in foreign markets, and matter of a semi-political nature, such as tariffs and reciprocity.

As before mentioned this book should prove to be a valuable help to those wishing to make a start in the export business, as apart from matters of general interest it contains much of value for the guidance of the manufacturer in establishing of connections, the handling of correspondence and both the foreign and domestic ends of the business.

THERE'S NO BOTTOM LEFT TO FALL OUT OF SCRAP MARKET

THE scrap metal market has fallen upon evil days. Apparently no person loves it. No person wants to buy, and no person wants to sell. Prices are on the skids and it may be that they will go lower than they are now quoted before they reach a basis from which a trade can be built up again. Reports from some of the larger American centres are as follows:

Pittsburgh.—The bottom has fallen out of the local scrap market and prices are on the skids. Heavy melting scrap has been offered as low as \$17 per ton delivered at furnaces, but the offer was turned down. Low phosphorous borings and turnings are down to a very low level with no takers.

Chicago.—Market conditions here are about as low as they could be. Only an occasional small sale is made, and that only where the purchaser wants the material for some particular purpose.

Railways are showing a tendency to take lower prices for their lists of scrap.

Philadelphia.—Prices have come down here through the week and there is nothing to indicate that recovery is in sight. Dealers have been forced to ship to save demurrage and this has forced prices. It is known that the Government has great piles of war scrap, which puts a damper on any rise in melting steel.

Buffalo.—The consumer can do what he wants in the market now. Prices have come down again, particularly in heavy melting steel. Some business has been started but only at the low levels of the new list.

New York.—There is only a nominal amount of trading and the tendency is very marked toward lower figures. Mills are fairly well filled and they are not going to come into the market until they have to.

St. Louis.—Trades among the dealers have almost disappeared, and no purchaser seems to have a desire to buy. All are contented to wait until some actual development has taken place.

WHAT GERMANY HAS PLANNED IN THE WAY OF HER AFTER-WAR TRADE

Kelley's Monthly Trade Review.—We have to recognize that Germany has prepared to win in the field of trade and commerce, when peace comes, what she has lost on the field of battle. The Germans have carried out a systematic plan for entering on peace with a great initial advantage against the countries which they have invaded, maltreated, and pillaged, but can no longer hold. The plan includes a good deal more than the destruction of factories, mines, farms, and gardens, which may be called negative measures. Her positive measures include stealing machinery and materials.

In the Lille-Croix-Roubaix-Turcoing area the mills and factories there were equipped with the most modern and costly machinery from Lancashire, Switzerland, Alsace, and America; the technical schools were storehouses of invaluable patterns and designs, which the Germans did not possess and cannot create. Then there are trade secrets, exclusive designs, and combinations, of which they have possessed themselves. Every manufacturer will understand what this means.

Herr Gwinner, of the Deutsche Bank, Berlin, and the late Herr Ballin, of the Hamburg-Amerika Line, have succeeded in establishing a bureau, which is provisionally named the "Company for Oversea Enterprises," with an initial capital of one million sterling. It has for its immediate object the "development of German trade, particularly in neutral countries." Large subscriptions have been guaranteed by wealthy firms, and the movement is one the importance of which our own commercial interests might do well to realize.

When final peace is concluded, the "Syndicate" will, among other things, take up such schemes abroad as waterway construction, harbor and dock works, and other projects of similar magnitude. Special attention is being given to the various South American States, notwithstanding the confiscation by most of them of German ships, one of the plans being to publish a newspaper in Spanish and Portuguese. Moreover, now that the Near Eastern oil fields are apparently beyond the possibility of German interference. Herr Ballin recently, with his late colleagues, negotiated with Mexican interests for the purchase of adequate supplies, control of which he tried to obtain just before the war began.

SELECTED MARKET QUOTATIONS

Being a record of prices current on raw and finished material entering into the manufacture of mechanical and general engineering products.

PIG IRON

Grey forge, Pittsburgh	\$32 75
Lake Superior, charcoal, Chicago.	37 50
Standard low phos., Philadelphia.	37 25
Bessemer, Pittsburgh	37 25
Basic, Valley furnace	33 40

Government prices.

	Montreal	Toronto
Hamilton		
Victoria	50 00	

IRON AND STEEL

Per lb. to Large Buyers.

	Cents
Steel bars, base, Toronto	4 90
Steel bars, base, Toronto	5 00
Steel bars, 2 in. to 4 in. base.	6 00
Steel bars, 4 in. and larger base.	7 00
Iron bars, base, Montreal	4 55
Steel bars, base, Montreal	5 05
Reinforcing bars, base	4 50
Steel hoops	7 50
Norway iron	11 00
Tire steel	5 50
Spring steel	8 00
Brand steel, No. 10 gauge, base	5 05
Chequered floor plate, 3-16 in.	12 20
Chequered floor plate, 1/4 in.	12 00
Staybolt iron	11 00
Bessemer rails, heavy, at mill.	
Steel bars, Pittsburgh	*2 90
Tank plates, Pittsburgh	*3 25
Structural shapes, Pittsburgh ..	*3 00
Steel hoops, Pittsburgh	*3 50

F.O.B., Toronto Warehouse

Steel bars	5 50
Small shapes	5 75

F.O.B. Chicago Warehouse

Steel bars	4 10
Structural shapes	4 20
Plates	4 45

*Government prices.

FREIGHT RATES

Pittsburgh to Following Points

	Per 100 lbs.	C.L.	L.C.L.
Montreal	29	39 1/2	
St. John, N.B.	47 1/2	63	
Halifax	49	64 1/2	
Toronto	23 1/2	27 1/2	
Guelph	23 1/2	27 1/2	
London	23 1/2	27 1/2	
Windsor	23 1/2	27 1/2	
Winnipeg	81	106 1/2	

METALS

Lake copper	\$ 26 00	\$ 28 00
Electro copper	26 00	28 00
Castings, copper	25 00	26 00
Tin	70 00	78 00
Spelter	9 50	10 00
Lead	8 50	10 00
Antimony	10 00	11 50
Aluminum	40 00	50 00

Prices per 100 lbs.

PLATES

	Montreal	Toronto
Plates, 1/4 up	\$ 7 00	\$ 7 00
Plates, 3-16 in.	8 50	8 40

Per 100 lbs.

Per ton

Price List No. 38

Standard Butt weld

	Per 100 feet	
1/8 in.	\$ 6 00	\$ 8 00
1/4 in.	4 68	6 81
3/8 in.	4 68	6 81
1/2 in.	6 21	7 78
3/4 in.	7 82	9 95
1 in.	11 56	14 71
1 1/4 in.	15 64	19 90
1 1/2 in.	18 70	23 76
2 in.	25 16	32 01

2 1/2 in.	40 37	51 19
3 in.	52 79	66 94
3 1/2 in.	67 16	84 18
4 in.	79 57	99 74

Standard Lap weld

2 in.	38 81	35 34
2 1/2 in.	42 12	52 36
3 in.	55 08	68 47
3 1/2 in.	69 00	86 94
4 in.	81 75	103 00
4 1/2 in.	93	1 18
5 in.	1 08	1 37
6 in.	1 40	1 78
7 in.	1 83	2 32
8L in.	1 93	2 44
8 in.	2 22	2 81
9 in.	2 66	3 36
10L in.	2 46	3 12
10 in.	3 17	4 02

Terms 2% 30 days, approved credit.

Freight equalized on Chatham, Guelph, Hamilton, London, Montreal, Toronto, Welland.

Prices—Ontario, Quebec and Maritime Provinces.

WROUGHT NIPPLES

4" and under, 45%.	
4 1/2" and larger, 40%	
4" and under, running thread, 25%.	
Standard couplings, 4" and under, 35%.	
4 1/2" and larger, 15%.	

OLD MATERIAL

Dealers' Buying Prices.

	Per 100 Pounds	Montreal	Toronto
Copper, light	\$15 00	\$13 00	
Copper, crucible	19 50	15 00	
Copper, heavy	18 50	15 00	
Copper, wire	18 50	15 00	
No. 1 machine composition	18 00	14 00	
New brass cuttings	10 00	10 00	
Red brass turnings	13 00	10 00	
Yellow brass turnings ..	9 00	8 00	
Light brass	7 00	7 50	
Medium brass	9 00	9 00	
Scrap zinc	5 1/2-6	5 00	
Heavy lead	5 1/2	8 00	
Tea lead	4 1/2	3 50	
Aluminum	18 00	18 00	

Per Ton

Heavy melting steel	15 00	15 00
Shell turnings	9 00	8 00
Boiler plate	16 00	15 00
Axles (wrought iron) ..	38 00	15 00
Rails	20 00	15 00
No. 1 machine cast iron	28 00	18 00
Malleable scrap	23 00	15 00
Pipe wrought	16 00	8 00
Car wheels	25-30	18 00
Steel axles	34 00	20 00
Mach. shop turnings ...	9 00	6 00
Stove plate	16 00	14 00
Cast boring	11 00	8 00

BOLTS, NUTS AND SCREWS

	Per Cent.
Carriage bolts, 3/4" and less.....	10
Carriage bolts, 7-16 and up.....	net
Coach and lag screws	25
Stove bolts	55
Plate washers	List plus 20
Elevator bolts	5
Machine bolts, 7-16 and over.....	net
Machine bolts, 3/4 and less	10
Blank bolts	net
Bolt ends	net
Machine screws, fl. and rd. hd., steel	27 1/4

Machine screws, o. and fl. hd., steel	10
Machine screws, fl. and rd. hd., brass	add 20
Machine screws, o. and fl. hd. brass	add 25
Nuts, square blank	\$1 50
Nuts, square, tapped	1 75
Nuts, hex., blank	1 75
Nuts, hex., tapped	2 00
Copper rivets and burrs, list plus	30
Burrs only, list plus	50
Iron rivets and burrs	25
Boiler rivets, base 3/4" and larger	\$8 50
Structural rivets, as above.....	8 40
Wood screws, flat, bright	72 1/2
Wood screws, O. & R., bright....	67 1/2
Wood screws, flat, brass	37 1/2
Wood screws, O. & R., brass	32 1/2
Wood screws, flat, bronze	27 1/2
Wood screws, O. & R., bronze	25

MILLED PRODUCTS

	Per Cent.
Set screws	25
Sq. & Hex. Head Cap Screws....	20
Rd. & Fil. Head Cap Screws	net
Flat But. Hd. Cap Screws.....	plus net
Fin. & Semi-fin. nuts up to 1 in....	25
Fin. & Semi-fin. nuts, over 1 in., up to 1 1/2 in.	20
Fin. and Semi-fin. nuts over 1 1/2 in., up to 2 in.	plus 10
Studs	net
Taper pins	40
Coupling bolts, plus	10
Planer head bolts, without fillet, list plus	10
Planer head bolts, with fillet, list plus 10 and	10
Planer head bolt nuts, same as finished nuts.	
Planer bolt washers	net
Hollow set screws	list plus 20
Collar screws	list plus 30, 10
Thumb screws	20
Thumb nuts	65
Patch bolts	add 40, 10
Cold pressed nuts to 1 1/2 in....	add \$4 50
Cold pressed nuts over 1 1/2 in....	add 7 00

BILLETS

	Per gross ton
Bessemer billets	\$47 50
Open-hearth billets	47 50
O.H. sheet bars	51 00
Forging billets	60 00
Wire rods	57 00

Government prices.

F.O.B. Pittsburgh.

NAILS AND SPIKES

Wire nails	\$5 50	\$5 30
Cut nails	5 85	5 65
Miscellaneous wire nails		60%
Spikes, 3/4 in. and larger		\$7 50
Spikes, 1/4 and 5-16 in.		8 00

ROPE AND PACKINGS

Drilling cables, Manila	0 39
Plumbers' oakum, per lb.	0 10
Packing, square braided	0 38
Packing, No. 1 Italian	0 44
Packing, No. 2 Italian	0 36
Pure Manila rope	0 37
British Manila rope	0 31
New Zealand hemp	0 31
Transmission rope, Manila	0 43
Cotton rope, 1/4-lb. and up.....	0 74

POLISHED DRILL ROD

Discount off list, Montreal and Toronto	net
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MISCELLANEOUS

Solder, strictly	0 43
Solder, guaranteed	0 45
Babbitt metals	18 to 70
Soldering coppers, lb.	0 58
Lead wool, per lb.	0 16
Putty, 100-lb. drums	6 75
White lead, pure, cwt.	17 80
Red dry lead, 100-lb. kegs, per cwt.	15 50
Glue, English	0 35
Tarred slater's paper, roll ...	1 30
Gasoline, per gal., bulk	0 33
Benzine, per gal., bulk	0 32
Pure turpentine, single bbls., gal.	1 10
Linseed oil, raw, single bbls. ..	1 70
Linseed oil, boiled, single bbls. ..	1 73
Plaster of Paris, per bbl.	4 50
Sandpaper, B. & A.	List plus 43
Emery cloth	list plus 37½
Sal Soda	0 03½
Sulphur, rolls	0 05
Sulphur, commercial	0 04½
Rosin "D," per lb.	0 07
Rosin "G," per lb.	0 08
Borax crystal and granular	0 14
Wood alcohol, per gallon	2 00
Whiting, plain, per 100 lbs.	2 50

CARBON DRILLS AND REAMERS

	Per Cent.
S.S. drills, wire sizes up to 52 ...	35
S.S. drills, wire sizes, No. 53 to 80	40
Standard drills to 1½ in.	40
Standard drills, over 1½ in.	40
3-fluted drills, plus	10
Jobbers' and letter sizes	40
Bit stock	40
Ratchet drills	15
S.S. drills for wood	40
Wood boring brace drills	25
Electricians' bits	30
Sockets	40
Sleeves	40
Taper pin reamers	net
Drills and countersinks... list plus	40
Bridge reamers	50
Centre reamers	10
Chucking reamers	net
Hand reamers	10
High speed drills, list plus	75
High speed cutters, list plus	40

COLD ROLLED SHAFTING

At mill	list plus 40%
At warehouse	list plus 60%
Discounts off new list. Warehouse price at Montreal and Toronto	

IRON PIPE FITTINGS

Malleable fittings, class A, 20% on list; class B and C, net list. Cast iron fittings, 15% off list. Malleable bushings, 25 and 7½%; cast bushings, 25%; unions, 45%; plugs, 20% off list. Net prices malleable fittings; class B black, 24½c lb.; class C black, 15½c lb.; galvanized, class B, 34c lb.; class C, 24½c lb. F.O.B. Toronto.

SHEETS

	Montreal	Toronto
Sheets, black, No. 28..	\$ 8 00	\$ 7 00
Sheets, black, No. 10..	8 00	8 50
Canada plates, dull, 52 sheets	9 00	8 65
Can. plates, all bright.	9 50	9 50
Apollo brand, 10% oz. galvanized		
Queen's Head, 28 B.W.G.		
Fleur-de-Lis, 28 B.W.G.		
Gorbals Best, No. 28..		
Colborne Crown, No. 28		
Premier, No. 28 U.S.		9 00
Premier, 10% oz.		9 30
Zinc sheets	20 00	20 00

PROOF COIL CHAIN

¾ in., \$14.35; 5-16 in., \$13.85; ¾ in., \$13.50; 7-16 in., \$12.90; ½ in., \$13.20;	
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\$13.00; ¾ in., \$12.90; 1 inch, \$12.65; Extra for B.B. Chain, \$1.20; Extra for B.B.B. Chain, \$1.80.

ELECTRIC WELD COIL CHAIN B.B.

¾ in., \$13.00; 3-16 in., \$12.50; ¼ in., \$11.75; 5-16 in., \$11.40; ⅜ in., \$11.00; 7-16 in., \$10.60; ½ in., \$10.40; ⅝ in., \$10.00; ¾ in., \$9.90.

Prices per 100 lbs.

FILES AND RASPS.

	Per cent.
Globe	50
Vulcan	50
P.H. and Imperial	50
Nicholson	32½
Black Diamond	32½
J. Barton Smith, Eagle	50
McClelland, Globe	50
Delta Files	20
Disston	40
Whitman & Barnes	50

BOILER TUBES.

Size.	Seamless	Lapwelded
1 in.	\$32 00	\$.....
1¼ in.	36 00	
1½ in.	39 00	32 00
1¾ in.	39 00	32 00
2 in.	45 00	32 00
2¼ in.	48 00	34 00
2½ in.	50 00	40 50
3 in.	58 00	45 00
3¼ in.		52 00
3½ in.	70 00	54 00
4 in.	80 00	67 00

Prices per 100 ft., Montreal and Toronto
les 10.

OILS AND COMPOUNDS.

Castor oil, per lb.	
Royalite, per gal, bulk	18½
Palacine	21½
Machine oil, per gal.	26½
Black oil, per gal.	15
Cylinder oil, Capital	49½
Cylinder oil, Acme	39½
Standard cutting compound, per lb. 0	06
Lard oil, per gal.	\$2 60
Union thread cutting oil antiseptic	88
Acme cutting oil, antiseptic	37½
Imperial quenching oil	39½
Petroleum fuel oil	13½

BELTING—NO. 1 OAK TANNED.

Extra heavy, single and double..	30%
Standard	30,10%
Cut leather lacing, No. 1	2 20
Leather in sides	1 75

TAPES.

Chesterman Metallic, 50 ft.	\$2 00
Lufkin Metallic, 603, 50 ft.	2 00
Admiral Steel Tape, 50 ft.	2 75
Admiral Steel Tape, 100 ft.	4 45
Major Jun. Steel Tape, 50 ft.	3 50
Rival Steel Tape, 50 ft.	2 75
Rival Steel Tape, 100 ft.	4 45
Reliable Jun. Steel Tape, 50 ft.	3 50

PLATING SUPPLIES.

Polishing wheels, felt	3 25
Polishing wheels, bull-neck..	2 00
Emery in kegs, American....	07
Pumice, ground	3½ to 05
Emery glue	28 to 30
Tripoli composition	06 to 09
Crocus composition	08 to 10
Emery composition	08 to 09
Rouge, silver	35 to 50
Rouge, powder	30 to 45

Prices Per Lb.

ARTIFICIAL CORUNDUM

Grits, 6 to 70 inclusive	.08½
Grits, 80 and finer	.06

BRASS.

Brass rods, base ½ in. to 1 in. red..	0 38
Brass sheets, 24 gauge and heavier, base	0 43

Brass tubing, seamless	0 48
Copper tubing, seamless	0 48

WASTE.

White.	Cts. per lb.
XXX Extra.. 20	Atlas
Peerless 21	X Empire ... 17½
Grand 19½	Ideal
Superior ... 19%	X press 16
X L C R ... 18½	

Colored.

Lion 15	Popular 12
Standard ... 13½	Keen 10½
No. 1 13½	

Wool Packing.

Arrow 25	Anvil 15
Axle 20	Anchor 11

Washed Wipers.

Select White. 11	Dark colored. 09
Mixed colored 10	

This list subject to trade discount for quantity.

RUBBER BELTING.

Standard ... 10%	Best grades .. 15%
------------------	--------------------

ANODES.

Nickel	.58 to .65
Copper	.38 to .45
Tin	.70 to .70
Zinc	.18 to .18

Prices Per Lb.

COPPER PRODUCTS.

	Montreal	Toronto
Bars, ½ to 2 in.	42 50	48 00
Copper wire, list plus 10 ..		
Plain sheets, 14 oz., 14x60 in.	46 00	44 00
Copper sheet, tinned, 14x60, 14 oz.	48 00	48 00
Copper sheet, planished, 16 oz. base	46 00	45 00
Braziers,' in sheets, 6x4 base	45 00	44 00

LEAD SHEETS.

	Montreal	Toronto
Sheets, 3 lbs. sq. ft.	\$13 25	\$18 25
Sheets, 3½ lbs. sq. ft. ..	13 25	13 25
Sheets, 4 to 6 lbs. sq. ft.	12 50	12 50
Cut sheets, ½c per lb. extra.		
Cut sheets to size, 1c per lb. extra.		

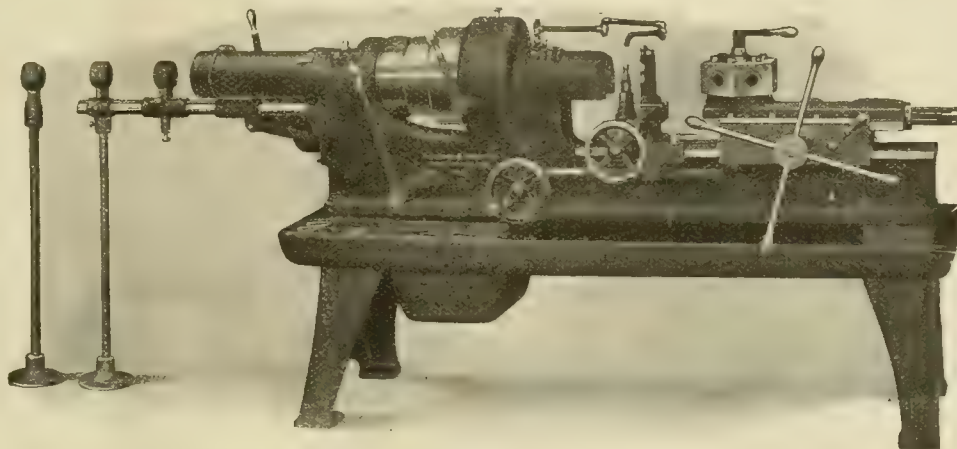
PLATING CHEMICALS.

*Acid, boracic	\$.25
Acid, hydrochloric	.06
Acid, nitric	.14
Acid, sulphuric	.06
Ammonia, aqua	.23
Ammonium carbonate	
Ammonium, chloride	.55
Ammonium hydrosulphuret	.30
Ammonium sulphate	.15
Arsenic, white	.27
Copper, carbonate, annhy	.50
Copper, sulphate	.22
Cobalt, sulphate	.20
Iron perchloride	.40
Lead acetate	.35
Nickel ammonium sulphate	.25
Nickel carbonate	.32
Nickel sulphate	.35
Potassium carbonate	1.80
Potassium sulphide (substitute)	2 25
Silver chloride (per oz.)	1.45
Silver nitrate (per oz.)	1.20
Sodium bisulphite	.15
Sodium carbonate crystals	.05
Sodium cyanide, 127-130%	.40
Sodium hydrate	.22
Sodium hyposulphite, per 100 lbs.	6.00
Sodium phosphate	.18
Tin chloride	1.75
Zinc chloride, C.P.	.80
Zinc sulphate	.15
Prices per lb. unless otherwise stated.	

Warner & Swasey Screw Machines

For large output and close limits—If you are figuring on screw machine work you can depend on W. & S. machines being right for the job.

We can supply you from stock immediately.



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WINNIPEG, VANCOUVER

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TORONTO

Acid Electric STEEL CASTINGS

Acid Electric Steel Castings show superior ability to resist wear and crystallization. They are smooth in texture, free from Blow Holes, and machine perfectly. We specialize in

Railroad and Other High Grade Castings

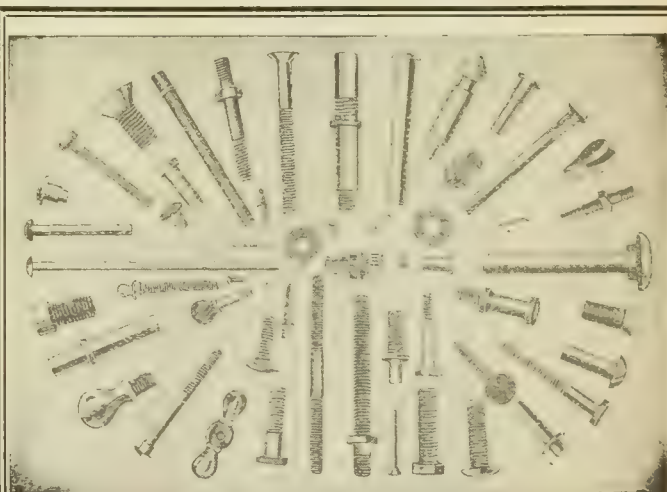
up to 15 tons, any specification. Electric Steel Castings COST NO MORE than ordinary Steel Castings.

Prices on Application—Prompt Deliveries

The Thos. Davidson Mfg. Co., Limited

Steel Foundry Division, Lachine Canal

Head Office: 187 Delisle St. MONTREAL
Phone Victoria 1492



Automatic Screw Machine

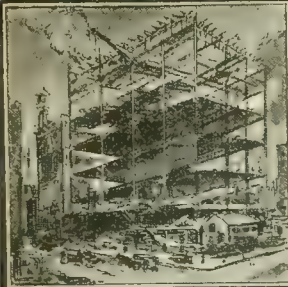
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Our Mechanical Engineers are
at the service of our Clients.

United Brass & Lead, Limited

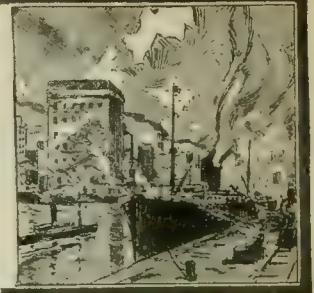
St. Helen's Avenue, - Toronto

W. L. TOBIAS, Superintendent
Formerly Superintendent National Cash Register Co.



INDUSTRIAL NEWS

NEW SHOPS, TENDERS AND CONTRACTS
PERSONAL AND TRADE NOTES



ENGINEERING

Estevan, Sask.—A meeting was held here of the municipalities interested in power development. One of the chief resolutions provided: "That the Provincial Government be asked to request the Dominion Power Board to at the earliest possible moment institute an enquiry into the development of power at the coal fields in Southern Saskatchewan for the purpose of distributing said power to Moosejaw, Regina, Welburn and intervening points that can be economically reached east, north and west of Estevan. Said enquiry to cover all questions related to the above project and that the Advisory Council for Scientific and Industrial Research be asked to co-operate." A permanent committee was named as follows: C. A. Manlove, Estevan; City Commissioners of Brandon, Weyburn, Regina, Moose Jaw; Major Cowan, M.P., Regina; C. C. Smith, Estevan.

PERSONAL

Charles Dawson, of Campbellford, who was superintendent of the Quinlan and Robertson Limited, of Montreal, munition plant, sued the company for \$3,000, salary and bonus; \$22,353.61, amount of a promissory note, and interest; and Mr. Justice Latchford has given him judgment for \$24,353.61 and costs with interest on \$22,353.61 from December 31, 1917. The company's counter-claim is dismissed with costs.

Col. Thos. Cantley, chairman of the board of directors of the Nova Scotia Steel & Coal Company sailed last week on the S.S. Metagama for London. The operations of the Scotia Company during the war period were very extensive, and it is understood that Col. Cantley during his trip to London will confer with the British iron masters regarding the extending of the terms of the contracts for the Wabana ore of the Scotia Company. Negotiations will also be carried out with the Canadian and Imperial authorities regarding the claims of Nova Scotia Steel & Coal Company for five steamers torpedoed by the enemy during the war period. Afterwards Col. Cantley will go to Paris and effect a final settlement regarding the transactions carried out by the Scotia Company with that Government.

Richard Llano Newman, naval architect and consulting engineer, who, until the end of last year, was resident in Montreal, died recently of influenza at West Point, Virginia, where, as president of the New York River Shipbuilding Corporation, he had gone to con-

struct ships for the United States Emergency Fleet. Mr. Newman was born at Devonport, England, where his father was an important official of the Naval Dock Yard, but had lived in Canada and the United States about thirty years practising his profession. Mr. Newman

lived for a time in Ottawa, where he did work for the Department of Marine and Fisheries in designing and supervising the construction of vessels for that department. He also designed and supervised the construction of ships for the Grand Trunk and Pacific Railway.

LONDON FIRM FIND IT PAYS TO BUY TRACTORS IN THE STATES

Arthur W. White, vice-president and manager of George White and Sons Limited, of London, Ont., in an interview with CANADIAN MACHINERY outlined a few reasons why he fears that the action of the Government in removing the duty from farm tractors was not a good one. He opines that it will have a large bearing on the prosperity of Canada during the period of reconstruction upon which this country is about to enter. According to Mr. White, owing to the removal of the duty his industry is running with about half the usual staff of men.

Mr. White says: "Since the Order-in-Council of February 7, 1918, removed the duty on tractors, we have purchased about half a million dollars' worth of tractors in the United States, and utilized our sales and distributing organization to dispose of them in Canada. If we could make them as cheaply as we can buy them in the United States, we would be making them. There have been between one and a half and two million dollars spent in the United States purchasing tractors since the Order-in-Council came into effect, and this amount of money has not paid one dollar on the Canadian War Debt, except the small amount of income tax on the profit of the distributors.

"As a quid pro quo the Government allowed a drawback of 99 per cent. of the duty on raw material entering into the construction of tractors. This is a vicious policy, as it forces manufacturers into the United States to purchase their raw material.

"Manufacturers of farm machinery sell to the final consumer, and between them and the original raw material—the ore and the forest tree—there are many intermediate manufacturers, all of whom are protected from 20 to 42½ per cent. Every manufacturer who is forced to buy his raw material in the United States, owing to being allowed drawback, is one less customer to the intermediate manufacturer.

"What Canadians have to determine is what is best for Canada. It is a question of economics. The questions of reconstruction, of caring for returned soldiers, of paying the war debt, are also questions of economics.

"Manufacturers of farm machinery in Canada, with a market of eight million, cannot compete with the highly specialized industries of the United States, with their market of a hundred million,—manufacturers who are close to their raw material and close to their selling market; manufacturers whose output is from 100 to 50 per cent. larger than their Canadian competitors.

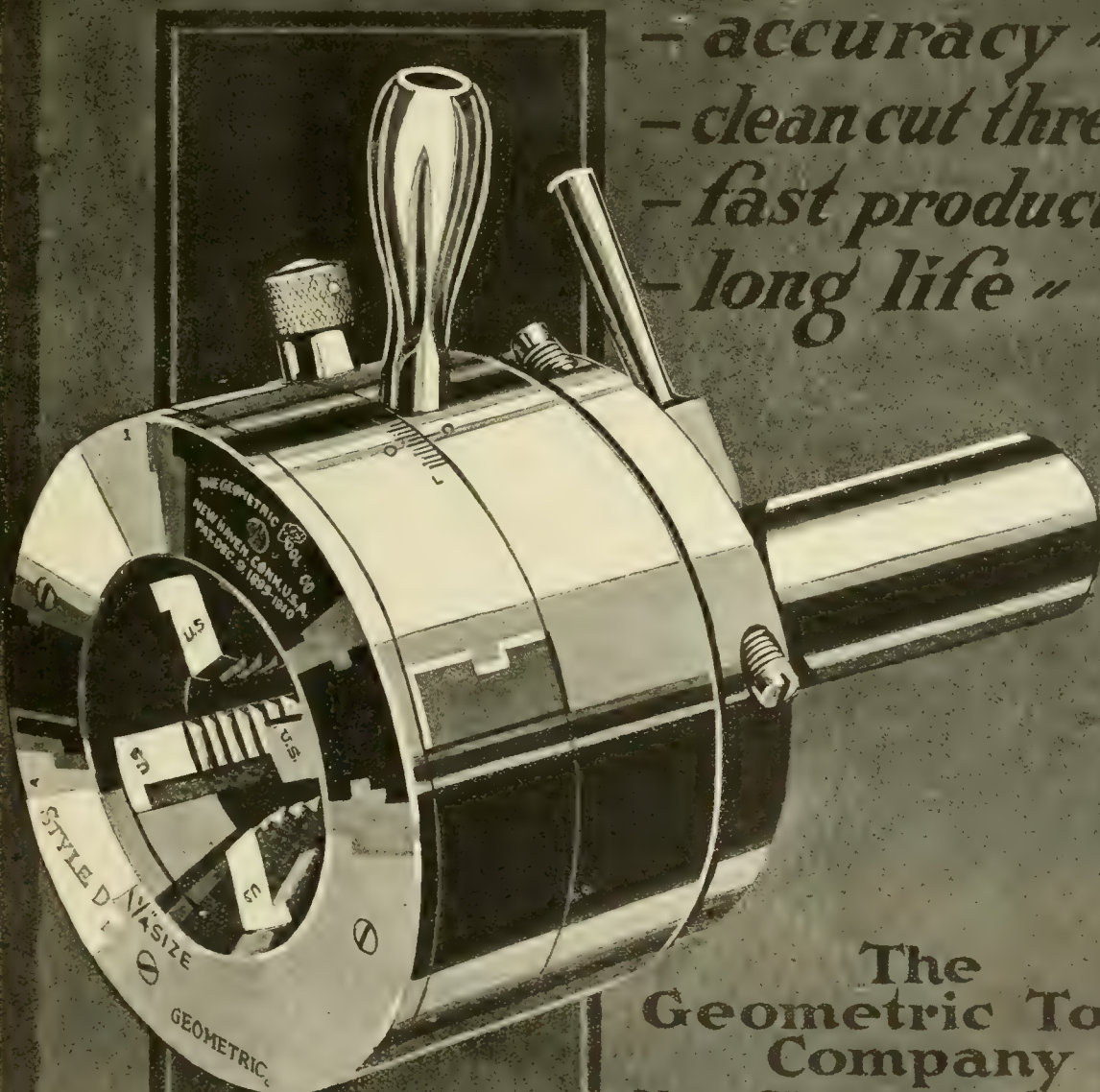
"If Canada is better off without farm machinery manufacturers, then the move is a good one, but it always has to be borne in mind that someone has to pay the war debt, and someone has to take care of the Canadian returned soldiers. The Extra War Profits Tax and Income Tax has drawn a very large percentage of the war loans and war debts from the manufacturers and the cities; a very small percentage being collected from the farmers. All manufacturers have pledged themselves to give jobs back to all men on their honor roll. This cannot be accomplished if the market for their goods is decreased. Men who have been through terrible years of war cannot be expected to have the earning power they had when they went away. The manufacturers will have to stand this loss, as the returned soldiers are entitled to the best wages going. It will be a matter of re-education. We have always had the question of the unemployed and employers of labor have found that it is more a question of men being 'unemployable' than being 'unemployed.' A large percentage of the returned soldiers, for a considerable time, will be actually unemployable, through no fault of theirs. It is up to the Government, to the manufacturer, the merchant and the farmer to take care of these men, and forcing manufacturers to purchase goods in the United States is a poor way to begin.

GEOMETRIC

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Specify Them for

- accuracy " "*
- clean cut threads*
- fast production*
- long life " " "*



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Geometric Tool
Company**
New Haven, Conn.

Canadian Agents:

Williams & Wilson, Ltd., Montreal; The A. R. Williams
Machinery Co., Ltd., Toronto, Winnipeg and St. John, N.B.

Output of the 18 pr. H. E. Shells in Canada

In the Annual Review Number of CANADIAN MACHINERY figures were given of the production of British shells in Canadian shops. Following is a list that was not included. In some cases there may be some discrepancy in figures. This can, in many cases, be accounted for by the difference between the shells turned out and the shells shipped, due to storage. The 18-pound H.E. shell figures, however, are comparatively complete as follows:

Alberta Foundry & Machine Co., Medicine Hat..	86,794
Alton Foundry Co., Alton, Ont.....	25,000
Beatty & Sons, Welland.....	39,947
Bell Engineering & Thresher Co., Goderich.....	55,212
Bertram & Sons Co., Dundas.....	75,000
Brown, Boggs Co., Hamilton.....	15,000
Buckeye Machinery Co.....	19,640
Calgary Iron Works, Calgary.....	15,992
Canadian General Electric Co.....	
Canadian Allis Chalmers, Toronto.....	75,670
Canadian Buffalo Forge, Kitchener.....	95,070
Canadian Crocker Wheeler, St. Catharines.....	25,158
Canadian Fairbanks-Morse, Toronto.....	10,000
Canadian Foundry & Machine Co.....	28,821
Canadian Ingersoll Rand, Sherbrooke, Que.....	78,155
Canadian Western Foundry.....	25,867
Canadian Westinghouse, Hamilton.....	150,210
Chapman Double Ball Bearing Co., Toronto.....	29,211
Chapman Eng. & Mfg. Co., Dundas, Ont.....	34,416
Cluff Bros., Toronto.....	50,038
C. N. R. Co., Winnipeg.....	33,867
C. P. R. Co., Winnipeg.....	62,678
Darling Bros., Montreal.....	35,606
Dickson Bridge Works, Campbellford, Ont.....	59,560
Dominion Bridge Co., Montreal.....	527,207
Dominion Bridge Co., Winnipeg.....	30,810
Dominion Harvester Co.....	7,670
Electric Steel & Metals, Welland.....	62,014
Edmonton Iron Works.....	48,433
Frost & Wood Co., Smith's Falls.....	24,978
G. T. Ry., Winnipeg.....	7,032
Holden Morgan Co., Toronto.....	87,919

International Supply Co.....	10,000
Invincible Machine Co., Walkerville.....	52,010
Lachine Mfg. Co.....	124,041
Manitoba Bridge & Iron Works, Ltd., Winnipeg	77,862
Manitoba Engines Ltd.....	35,185
Manitoba Shell Co.....	5,505
Mfg. & Contracting Co. of Canada, Ltd.....	225,156
Marsh & Henthorne, Ltd., Belleville.....	38,979
Massey Harris Co., Toronto.....	97,128
Mechanical Eng. Co., Ltd., Three Rivers, Que..	22,000
Medicine Hat Pump & Brass Mfg. Co., Ltd....	10,000
Metal Drawing Co., Ltd., St. Catharines, Ont..	60,000
National Mfg. Co., Ltd., Ottawa.....	18,084
Northern Electrical Co., Ltd., Montreal.....	56,022
Northern Engineering & Supply Co.....	10,000
Northern Foundry & Machine Co., Ltd., Sault Ste. Marie.....	36,911
Otis-Fensom Elevator Co., Ltd., Hamilton.....	58,075
Peterboro Machine & Lub. Co.....	24,987
Prescott Emery Wheel Co., Ltd.....	24,625
Robertson Mfg. Co., Ltd., Milton.....	50,238
Rollefson Elevator Co., Ltd., Galt.....	25,015
Russell Motor Car Co., Ltd., Toronto.....	99,544
Saskatchewan Bridge & Iron Co.....	86,136
Sheldons, Ltd., Galt.....	70,000
Steel & Radiation Ltd., Toronto.....	98,691
Strong-Scott Mfg. Co., Ltd., Winnipeg.....	16,060
St. Thomas Construction Co.....	33,000
Transcona Shell Co.....	745,335
Universal Tool Steel Co., Ltd., Toronto.....	221,190
Vancouver Engineering Works.....	435,688
Victoria Machinery Depot.....	283,713
Vulcan Iron Works, New Westminster, B. C....	414,229
Vulcan Iron Works, Winnipeg.....	72,552
Western Machinery Co.....	10,000
Western Shell & Box Co.....	7,914
Wilford Co., Ltd., F. R.....	49,984
Western Drydock & Shipbuilding Co.....	20,000
Western Foundry & Machine Co.....	10,000
Zenith Machine Co., Ltd.....	24,000

TRADE GOSSIP

Large Fire Loss.—Damage amounting to approximately \$250,000 was sustained when the four storey building of the T. A. Walsh Co., Vancouver, was destroyed by fire. Large shipments of goods from the Orient and Mexico were held in bond in the building, and were a total loss.

Fire Cause Unknown.—The plant and buildings of A. Blair Company's tile plant at Woodstock were destroyed by fire, causing a loss of \$30,000. The call was received at 4.15 at the fire hall, and was immediately responded to, but before the scene was reached the blaze was beyond control. The adjacent lumber yards were only saved by the absence of wind. The loss is only partly covered by insurance.

Elected Officers.—At the annual meeting of Toronto Builders' Exchange following officers were elected for the year 1919: President, A. D. Grant; first vice-president, Walter Davidson; second vice-president, A. H. Dancy; treasurer, John Altridge; secretary, David J. Davidge; board of directors: John V. Gray, C. B.

Jackson, J. Robt. Page, Geo. E. Stocker, Gordon R. Douglas, A. Matthews, John Wickett, W. Boyce, Geo. Webb, W. R. Painter.

Trade With China.—Dr. George E. Morrison, one of the best informed authorities on actual conditions in China, speaking of the possibilities of Canadian trade in China, suggested flour, agricultural implements and machinery, and said that a man of high rank should be sent there to investigate trade conditions. The anti-opium laws are not so well enforced as formerly, but the traffic will ultimately be stamped out.

Calgary Firm Gets Contract.—The contract for the proposed new hospital building at Ponoka, in connection with the insane asylum there, has been let. The firm securing the contract is the Thomas Jamieson and McKenzie of Calgary, and the amount of the contract is \$144,000. The building will be of brick, and will give accommodation to one hundred people. It is hoped to have the building completed and ready for service next fall.

Overseas Trade.—Col. D. Carnegie, ordnance advisor of the Imperial Munitions Board, has every confidence in Canada's future during the reconstruction period. Canada's workmen have proved themselves so skillful in the manufacture of munitions that he thought that it was "only a question of knowing where to go to get a share of the reconstruction work overseas." He did not think there was any immediate danger of over-production in the ship-building trade.

To Triple Output.—The introduction of mining machinery to the Minto Coal Mines is being considered by the C.P.R. magnates interested. Mr. John Henderson has left for the West Virginia, Ohio, and Pennsylvania coal fields to study the methods in use in these districts. The suggestion to instal machinery came from the experts of the U. S. fuel controller, who visited the mine to make a study and report on the best methods of speeding production.

Tried to Blow Up Bridge.—Last week an attempt was made to blow up the

Getting the Power "there" at Lowest Cost

Necessitates the use of belts that are best adapted for the work they are to do.

A belt, no matter of what kind, is not the best belt for every drive in the plant.

The illustrations to the right will give you some suggestions as to where you can use Scandinavia Belting to advantage. These are not the only transmission conditions under which this material can be used, but they give you a general idea.

Scandinavia Belting is a solid woven belt and there are no plies to come apart. If you have a heavy drive and wish to use an adhesive dressing you can use it on this belt without danger of opening up plies and joints.

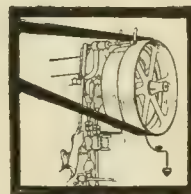
Have your plant men necessary information on using belts? We publish a monthly which is sent FREE for the asking.

Lanco Balata belting makes a good motor drive belt as it has little stretch.

Federal Engineering Co.

LIMITED

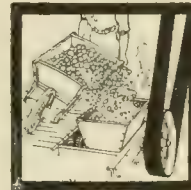
172 John Street Toronto



GOOD ON BELT SHIFTERS



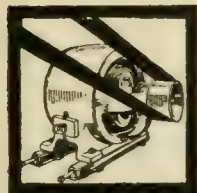
GOOD IN OILY PLACES



GOOD IN DUSTY PLACES



GOOD IN HOT PLACES



GOOD MOTOR DRIVE BELT

The Financial Post THIS WEEK

ON BANK MERGERS

"IN conclusion, let us repeat that THE FINANCIAL POST stands against bank mergers or other business or industrial combinations which will permit of restriction of public service or the exaction of undue profits, but favors such consolidations as tend to reduce costs of production or service rendered, which is in the last analysis in the interests of the whole people."

ON THE TARIFF PROBLEM

"THE FINANCIAL POST does not now and never has defended a 42½ per cent. tariff; it does not stand for any specific tariff, but it does stand for the intelligent and adequate protection of national industries so that Canada may secure the full benefits of the developments of all her natural resources. That this may be accomplished and that at the same time the necessities of a tariff for revenue may be carefully considered, we have time and again advocated the appointment of a tariff commission to treat scientifically with the whole situation and to provide a meeting ground for the divergent opinions of labor, industry and agriculture."

ON THE PORK SITUATION

"The newspaper contention that Mr. Hoover is getting the British business for American firms, and that the British Government is discriminating against the Canadian product, is hardly a correct or a fair one. The embargo is absolute, against both Canadian and American pork products."

Besides the important articles from which the above quotations are made, THE POST this week deals with the following, amongst other

SUBJECTS OF INTEREST

The Effects of Merger on Bank of Nova Scotia

Australia to Have Agent at Ottawa Uniform Laws for All Canada

Peace Between Capital and Labor—And Prosperity

The December Bank Statement

Small Packing Plant to Close

Brompton Shows Slight Drop in Earnings on Common

Over \$350,000,000 Put Into Electric Projects Total Clearings for the Week Show Increase Canadian and American Banking Interests Join

A Bank Misunderstanding With Customer London Supreme in Money Market

About Bank Mergers (Editorial)

Farmers' Platform on Economic Issues

Scarcity of New Issues is Market Feature

New Pulp and Paper Issue Announced

Manufacturers of B.C. Discuss Income Tax Ratepayers of Halifax Vote Dissatisfaction

Quebec Province Has Large Surplus Excelsior Life Wrote Record New Business

Continental Life Writes \$2,946,762 New Business

Border Cities Want Some of Housing Loan The Sugar Supply

Larger Loans and Profits of Dominion Bank Effects of the Merger on Bank of Nova Scotia

Profits of Toronto General Trusts Show Recovery

Development of Trusts and Guarantee

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Mountain street bridge on the C.P.R. railway in Montreal. The offenders were detected in the act of lighting the fuse that led to twelve large sticks of dynamite placed on top of one of the stone pillars. It is thought that the purpose of the desperadoes was to wreck the bridge and effect a robbery from the express car that was generally located near this point.

Lumber Trade Handicapped.—Canadian lumber supplies are fast being depleted, according to Mr. Alfred Clarke, president of the Wholesale Lumbermen's Association. Owing to the entire absence of snow, there is practically not more than 10 per cent. of the season's cut removed from the bush up to the present. Labor conditions are also bad, and some of the firms have given up operations for the winter. Under these circumstances, a further advance in prices of lumber is almost inevitable.

Gillette Report.—At the annual meeting of shareholders of the Gillette Safety Razor Company of Canada, held in Montreal, announcement was made that the company proposed invading such countries as Mexico, British East Indies, Cuba and the various South American countries, as well as Central America, while salesmen had already started for England, France, Italy, Russia, Australia, New Zealand, South Africa, China and Japan, where they will establish sales organizations and distributing stations.

Advises Agreement.—The question of the increased tariffs for local switching, which the Toronto Board of Trade and the C. M. A. are combatting, will be disposed of finally at a meeting of the interested parties before the Railway Board, at Toronto, unless they can come to some agreement in the meantime. Sir Henry Drayton, chairman of the commission, advised the contending parties to get together, explaining that it was a different matter to say what are fair charges on movements within terminals.

Damage Was Done.—Considerable damage to transmission and telegraph lines and suspension to railroad traffic resulted from a severe storm that passed over the St. Lawrence last week. The Canadian Government steamer Montcalm and the Canadian Voyageur, recently built at Montreal, and which left Quebec for Halifax earlier in the week, were caught in the storm and for many hours were unable to report their position, both vessels drifting along at the mercy of the storm. Subsequent reports reported all well.

Selling Agency for B.C.—For the purpose of enlisting practical interest in B. C.'s lumber export trade, Hon. T. D. Patullo, Minister of Lands, addressed a gathering of the lumbermen of the province. The Minister hopes that it may be possible to introduce machinery to deal with the whole question of export and shipping. As a result of his examination of the situation, he is convinced there is a large market for B. C. lumber, and he believes that what is

wanted is a selling agency in Europe, to deal with B. C. products as a whole.

Will Keep Working.—On Tuesday and Wednesday of last week, W. A. Janssen, operating manager of the Canada Steel Foundries was in Welland on business in connection with the local branch of that corporation. Following his visit it was decided to continue operations as at present. The operation of the rolling mills will be continued. The position of the Steel Foundries is much the same as it was two months ago. The business of the concern is dependent on the general condition of the country, and if this remains good the business of the Foundries will continue as formerly. "As far as I can see," stated the manager, "prospects are good, and there is no danger of a setback."

According to a report made at the annual meeting by Managing Director A. A. Bittues, the year 1918 was the best in the company's history, sales increasing 20 p.c. over the figures for the previous year, while the blade production in Canada gained 160 p.c., and razor production 301 p.c. in the same period. It was also announced that the company's steel plant in Sweden was now able to supply steel in unusual quantities, while shipping facilities, which were approaching normal, permitted them to ship to foreign countries and go after business in a more energetic manner than had been possible during the four years of war.

Meet In Montreal.—Arrangements have been made to hold a meeting of the iron and steel men of this district, ranging from Gananoque, Ont., east to Quebec, in Montreal on Thursday, January 30. The meeting will be addressed by Col. David Carnegie, of the Imperial Munitions Board, who has recently returned from England, where he has made a thorough study of European market conditions as affecting the steel industry of Canada. Invitations were sent out by the Canadian Manufacturers' Association, and this, a matter of vital importance to steel men in Canada, now that the manufacture of munitions has been suspended, will doubtless arouse much interest. A large number of the prominent iron and steel men of the district are expected to be present.

Changes Announced.—The C. A. Dunham Co., Ltd., Toronto, announce that a change has been made in their branch sales office at Montreal. A. Kastello, recently superintendent of construction for Imperial Munitions Board at Trenton, but formerly with Dominion Government and Grand Trunk Railway, has been installed as new branch manager in charge of their office at 711 New Birks Building. Mr. Kastello is to be assisted in the company's business by F. O. Hamel as heating engineer, formerly first assistant engineer in the Public Works Department, Dominion Government, at Ottawa. The C. A. Dunham Co., Ltd., are very optimistic over the prospects of building activity, and this change has been made to strengthen their organization and to render better service to their trade and clients in

Montreal. This company has experienced a very healthy growth during the war period.

At Owen Sound.—The Wm. Kennedy and Sons, Ltd., of Owen Sound, have erected an extension to their already large iron and steel plant. The new building is a substantial one of concrete, stone, brick and steel construction 200 feet by 46 feet, the walls being about 30 feet high. It is to be equipped with two cupolas for melting iron, an elevator for carrying pig and scrap iron, and coke to storage bins, situated some 14 ft. from the ground, a heavy traveling crane, boring and planing machinery, etc., for large propeller work, ship-deck machinery, turbine water wheels, etc. This company, in conjunction with some others, lately took over the property of the Owen Sound Iron Works and are carrying on there (under the supervision of Wm. Kennedy & Sons) construction of ship machinery, boiler works, cement and sawmill machinery, etc. They are employing a full staff of mechanics in both plants at present.

MARINE

Vancouver.—The Packers' Association of Vancouver, in their statement, say that last year's salmon pack was the largest in the history of the industry. It consisted of 1,616,157 cases of all varieties.

Vancouver.—The first of the 1,500-ton steamers building in British Columbia for the French Government was launched recently from the Lyall Shipyards. There are forty of these ships, twenty being built in Vancouver and twenty in Victoria.

Victoria, B.C.—It is understood here, by advices from London, that the shortage of tonnage is the main difficulty in the way of large timber orders being placed by the British authorities. Strenuous efforts are being made to provide Canadian vessels, and Hon. T. D. Patullo, Minister of Lands, has suggested the chartering of foreign vessels whenever practicable.

Toronto.—A January launching without the necessity of blasting the ice previously, took place at the yard of the Dominion Shipbuilding Co. The "General Currie" was the vessel concerned, and she is the first of a series to be named after famous Canadians. She is 261 feet long by 43 feet 6 inches, by 23 feet 6 inches, with a deadweight capacity of 3,550 tons.

Montreal.—Announcement is made of a drop in freight rates to \$1.50 per cubic foot. This is on business between Canada and the British Isles. Of course this is still much higher than the rates that were in use before the outbreak of the war. Shippers take this move to mean that before long the carrying companies will be out looking for business, which certainly has not been the case for some long months now.

Quebec.—An epoch-making event in the history of St. Lawrence navigation was the sailing of the Canadian Government steamer "Canadian Voyageur" from Quebec on January 21 en route to

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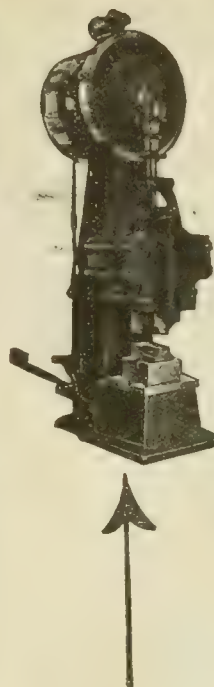
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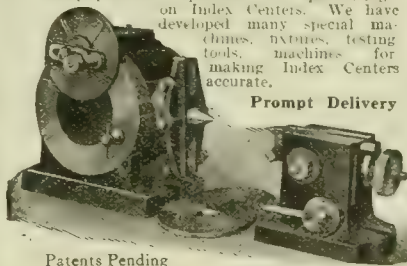
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Halifax. This is the first time a vessel of the size of the "Canadian Voyageur" has made the trip down the St. Lawrence in mid-winter, and those optimists who look for all-the-year-round navigation are watching the experiment anxiously. Among these is the Hon. D. B. Hanna, president of the Canadian National Railways Commission, which will eventually have charge of the Government fleet.

Porcupine. — In connection with the great work done in the Temiskaming district for the Victory Loan Campaign last year, the District of Temiskaming won the honor of naming one of the boats being built at the Polson Iron Works for the Imperial Munitions Board. The Committee had some difficulty in the length of the name, but eventually "War Temiskaming" was selected as the best available. The new boat accordingly will bear the name "War Temiskaming." It will be launched about the end of this month and a number from the North Land may go south to be present at the ceremony of launching.

London, Eng.—The president of the British Board of Trade, speaking at Huddersfield recently, said that the Government were anxious to remove all restrictions as fast as it could be accomplished, but restrictions on exports must be maintained in the interests of allied nations. The blockade must also be maintained. He also made the statement that there was more shipping available than cargo tonnage to employ it, and a big slump in freight rates was bound to occur. This does not necessarily mean that tonnage is up to its former level, but that in the restricted state of trading there are more ships than are required to handle the freight available.

Toronto.—C. A. Bogert, retiring president of the Toronto Board of Trade, in his address to that body, said: "Let us not entertain any illusive hopes respecting the future of shipbuilding in Canada. It is possible that the ships that are now being built for the Canadian Government will cost us at least double what they could be constructed for in a year or two hence. Shipbuilding conditions in this country do not compare favorably with those prevailing in Great Britain, or any other European centres. The enormous tonnage being launched all over the world will soon overtake the demand, and with rates decreasing in consequence, returns on the original investment of capital will be wholly inadequate."

Welland. — The "War Badger" was launched from the docks of the British American Shipbuilding Company, the ceremony being witnessed by thousands of citizens. Both sides of the canal were lined with interested spectators of this unique midwinter launching. Construction of this vessel was started in May last. She is of 3,500 tonnage, being 261 feet long, 43 feet beam. She will be ready for ocean service early this spring. The boat was christened by Mrs. H. E. Davidson, wife of one of the directors of the British American Shipbuilding Company which built the "War Badger." A sister ship, the "War Weasel," was launched early last fall and is rapidly

nearing completion. Two more ships, 320 feet long, are being built by this company in Welland.

Vancouver.—The salvage claims of the steamer "Salvore" against the Japanese steamer "Canada Maru" were granted by a judgment of Justice Martin in the Admiralty Court here. It would be recalled that this case was commented on owing to a peculiar circumstance connected with the ownership of the salving steamer. At the time when the salvage services were rendered the "Salvore" had been sold by her owners, the British Columbia Salvage Co., to John P. Davies, of Montreal, but the latter had not yet accepted delivery. The judgment awarded the British Columbia Salvage Co. \$162,700 without costs, and Mr. John P. Davies receives \$10,000 and his costs.

The "Canada Maru" went ashore near Cape Flattery on July 30 last, and was refloated August 5.

Hamilton.—The annual report of the Harbor Commission shows that considerable work has been done in this regard, most important being a complete hydrographic survey, including Desjardine canal up to Dundas, in the course of which \$5,000 soundings were taken. The new industrial area on the waterfront between Ferguson avenue and Wellington street, comprising about fourteen acres, is now in splendid condition. This industrial area is provided with a dock wall across the front of 650 feet and 1,150 feet on the east side, making a total of 1,800 feet of dockage, with a depth of water throughout of 18 feet. Railway connection can easily be made to this property from the railway lines which are already close to this point, and with the co-ordination of rail transportation and water shipping facilities, no finer factory sites could be found on any harbor on the Great Lakes.

MUNICIPAL

London, Ont.—The Government has handed over 7,200 wooden shell boxes to the city fuel controller to be distributed free among the families of soldiers who are in need of fuel. It is stated that the anthracite in the dealers' yards contains a great deal of slate and steps have been taken to cancel the license of the wholesaler responsible for the shipment.

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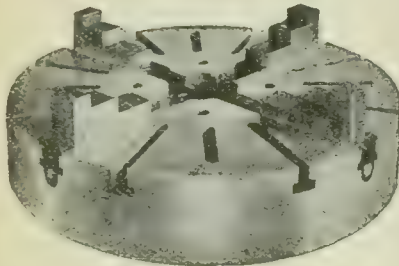
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Quebec.—Mayor Lavibueur has returned from a trip to Ottawa, where he saw Hon. Frank Carvell on the subject of the various public works which Quebec is interested in. The chief of these were the St. Charles River improvements in connection with the sewerage scheme, and the new car shops at St. Malo. Mr. Lavigueur expressed himself as well pleased with his trip and its results.

JAPAN GETS U. S. TRADE

Japan now has a monopoly of the cotton goods trade with Manchuria, though only about fifteen years ago the United States supplied 90 per cent. of the cotton goods imported by Manchuria, according to a statement issued by the Chamber of Commerce of Yokohama. Among the items Manchuria imported from Japan last year were 752,000 pieces of coarse cotton canvas, 327,000 pieces of printed cotton canvas, 350,000 pieces of fine cotton canvas, 162,000 pieces of satens, 134,000 pieces of sheetings and about 56,000,000 yards of wide calico.

SWORDS INTO PLOUGHSHARES

It is not in the United States alone that the implements of war are being converted into those of peaceful pursuits. In France, for example, it has been found that the smaller armored tanks will pull a fleet of canal boats at a speed of two miles an hour, which is reasonably rapid transit as applied to canal boats. Perhaps this will lead to the general retirement of those patient animals which have travelled towpaths for generations past. Commerce may approve the change, but the artist will be likely to throw down his brush with a gesture of regret.—Christian Science Monitor.

MACHINISTS' DATA BOOK IS ISSUED BY THE L. S. STARRETT CO.

For the convenience of the expert machinist who often wants certain shop information and data not easily remembered and seldom easy to find when needed, the L. S. Starrett Co., of Athol, Mass., has just published Volume II of the Starrett book, "The Starrett Data Book for Machinists." To insure its covering the field thoroughly, the Starrett Company secured as editors, Prof. H. P. Fairfield, of Worcester Polytechnic Institute; N. J. Bethel, production manager of The Taft-Peirce Co.; N. H. Edge, factory manager of The Locomobile Co., and J. C. Spence, superintendent of The Norton Co., and through their co-operation have been able to include practically all of the information, formulae, etc., essential to good shop-practice as found in the different classes of work produced in the several plants under the direction of the collaborating editors, and have avoided the elementary and theoretical matter which is of little or no value to a practical man. The new book, like Volume I, "The Starrett Book for Machinists' Apprentices," now in its thirty-fifth thousand, is of convenient pocket size, bound in red Athol leather, and is offered for examination, or for sale at 50c per copy at hardware dealers handling the Starrett line of tools.

ELECTRIC FURNACE INSTALLATION

The Electric Furnace Company, Alliance, Ohio, has just closed a contract with the Standard Roller Bearing Company, Philadelphia, for 190 kw. continuous, automatic, heat-treating equipment.

The set consists of one 150 kw. electric furnace for hardening and one 40 kw. electric heated oil drawing bath. There is supplied, in addition, an oil-quench bath located between the furnace and the electric-heated, oil drawing bath.

Material, which consists of alloy steel balls and ball races, is automatically handled through the furnaces, quench, and drawing baths in metal baskets.

FREQUENT FIRING A GOOD PRACTICE

It is far better to throw on a little coal at a time, and keep the fires bright, than to fire more heavily and at longer intervals. The loss from the distillation of unconsumed oily and tarry matters can be kept down in this way, because when fresh coal is scattered lightly over a bright fire the gases that are given off by each particle of coal become immediately ignited, if there is sufficient air present to burn them. The ideal method of firing would be to keep sprinkling small quantities of fresh coal upon the flame bed continuously, at a rate adapted to the rate of combustion that is to be maintained. This cannot be accomplished satisfactorily by hand-firing, but it may be approximated by firing frequently, using small amounts of coal, and seeing that what is thrown on is well distributed. The fireman should be careful not to carry out this idea too literally, however, because in so doing he might have the furnace doors open nearly half the time, and this would be bad practice. He should bear in mind the principle that the suggestion of frequent firing involves, and should endeavor to put it into practice as well as he can, consistently with preventing the inflow of an unreasonable amount of air through the furnace doors.

G. Clifford Walker, who, for the past three years, has been a salesman for H. W. Petrie of Montreal, died last week in Montreal, from influenza, after a few days' illness. Before joining the staff of H. W. Petrie he was manager of the Central Engineering Works of Montreal, and previous to this he was Western representative for Taylor and Arnold. Mr. Walker was 27 years of age and the son of the late Geo. Walker. One brother has been at the front since 1915.

Fred W. Evans, manager of the Toronto branch of the Canadian Fairbanks-Morse, is making favorable progress since his severe illness, and is able to sit up for a few hours daily now. Mr. Evans has been confined to his home since shortly after Christmas, and was critically ill for some time. His many friends will now hope for his speedy and complete recovery.

The Picture of the Workman in Copy

CONTINUED FROM PAGE TWO

and crawls into a pair of jumpers borrowed from the engineer. Smith is not over-enthusiastic about the proposition, because the jumpers are soiled and his grey trousers are in danger of spotting in consequence. The wrench is a weapon with which he is totally unfamiliar, and like the jumpers, it is greasy and unpleasant to hold. Inwardly blessing the boss who got him into this fix, he strikes an attitude, twists his features into a wan smile and is about to be snapped when someone suggests that workmen usually wear caps.

The wrench is heavy, and while a suitable headgear is being sought Smith takes a rest. Various attempts to make the traditional paper box cap out of office wrapping paper having failed, a cap is finally secured from a friend of the engineer who works in a machine shop down the street. The cap is dirty, and, moreover, it is three sizes too large. At this crisis the telephone operator mysteriously produces a safety pin, and the slack is taken up in the back. Again Smith gets set, and this time the picture is taken.

When it is developed some joy-killer blows in and calls attention to the fact that Smith had neglected to button his jumpers correctly, also that the average workman does not wear silk shirts, a high standing collar and a jewelled horseshoe pin on the job. Neither are his face and hands spotlessly clean, nor does he hold a pipe wrench as though it were a stick of dynamite. These kindly criticisms are harshly overruled, however, and Smith in all his misfit glory is handed down to posterity.

A lenient moving-picture audience may gaze with none too critical eye upon their favorite actor-hero clad in the faultlessly tailored garments of a hired man, a silk kerchief knotted carelessly around his throat and a wide Stetson perched at just the proper angle crowning his curling locks, but the reader of technical advertising copy demands something more from the advertising pages of his paper. Years ago he learned that there is no such thing as a left-hand monkey wrench, and his eye is super-critical in the matter of detecting flaws. The same man who will tolerate a technical blunder on the part of an idol of the screen will be the first to frown at an advertisement picturing a workman holding a micrometer the wrong way.

When it comes to relying upon an artist's conception of a typical workman the situation becomes far more complex and open to greater possibilities of misconception.

The distinctive badge of labor is supposed to be the paper box cap, yet in actual practice this form of idealistic headgear is about as commonly encountered as a high silk hat. Despite this there are many artists who readily yield to the temptation to draw the workman as tradition decrees he should exist, rather than picturing him as he really is.

Does a Machinist Dress Like His Picture?

For example, a typical type of modern machinist working in a machine shop at a lathe or grinder does not wear a red undershirt, sleeves rolled up over the elbows and buttons open at the neck to expose a chest resembling a male gorilla. On the contrary, the modern worker in a machine shop likely wears an old pair of dark trousers and a black shirt, buttoned at the neck. And instead of the paper box cap, his headpiece (if he wears any) is likely to be a cloth cap with a small peak, the front of the cap bearing the lettering, "Smoke Puff Puff Cigars." If this costume be varied, a change may be made by the addition of overalls and perhaps a jacket to match.

Upon consideration it is obvious that no standard figure, cut to pattern, can be used to personify the workman, because the garb of the workman changes to a great extent with his trade. The costume worn in the machine shop differs from that worn by the sand hog, and likewise the dress of a workman employed in the boiler room of a big central power station has little in common with the rig of the structural steel worker. To be true to life a drawing should properly fit the clothes to the job rather than hold to an established standard and attempt to make one pattern answer for all branches of labor.

A recent incident which came before the attention of the writer illustrates how quickly the trained reader grasps an inaccuracy of detail along the lines discussed above. This particular subscriber pointed in some disgust to a picture of a hand engaged in the act of placing some piston rod packing. The hand was supposed to belong to an engineer and just below a checked coat sleeve was shown a goodly expanse of white cuff. Closer inspection of the picture disclosed handsome cuff-links, an elaborate finger ring and carefully manicured finger nails. The whole made a combination which obviously was out of place and had nothing in common with

the reader's practical conception of the attributes belonging to a real honest-to-goodness engineer.

The only way to gain a clear vision of the workman as he is, is to seek him out on the job. And the seeker after such information may run into some surprises.

Entering the lathe department of a busy machine shop, for example, his cherished vision of uniformity will likely be rudely shattered. Although it be zero weather in January, the foreman will probably greet him wearing a battered straw hat, thus making a far different impression from his idea of the traditional figure of labor. The men at the machines, while possessing a uniform coating of oil and metal rust, fail to apply this same uniformity to their clothing. In general their main idea appears to be to select garments which will absorb a maximum quantity of dirt with minimum damage.

Turning to the power plant engineer for further enlightenment we find a strange liking for derby hats. Thus are ideals ruthlessly destroyed. The power plant engineer who has a desk fondles a warm regard for the conventional derby. When called upon to repair a broken elevator he may put on a black cloth cap and a pair of overalls, but while "receiving callers" he clings to the dicer.

Of Course, There Are Exceptions

The traditional workman has grown to be a sort of idealistic conception; a being related in some way to Santa Claus, Uncle Sam and John Bull, holding in his left hand a square-shaped tin lunch pail with rounded corners and a peculiar top like the periscope of a submarine, his brawny right hand grasping a hammer. Upon his head reposes the famous box cap and his mighty chest is bared to the breeze. And he is partial to red flannels and a sort of leather apron resembling a horse's bib.

To associate him with Longfellow's poem, "The Village Blacksmith," is entirely pardonable, but actually to meet him in the foundry, or boiler room, or swinging from a steel girder is beyond belief. If any lathe hand affected such a garb he would be guyed from one end of the shop to the other.

The reader of technical advertisements expects accuracy of statement in copy. Likewise he should be presented with reality in illustration, else the force of the argument loses weight regardless of its technical accuracy and the advertisement falls short of its mark.

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MECHANICAL ENGINEER AND DRAUGHTSMAN. Now open for position in the above field, have had extensive shop experience and am especially good at machine design. Have executive ability and have gotten results from men, principally for the reason that I speak a language that they understand. I have handled correspondence, am used to meeting the public and have a good record as a salesman. There certainly is a company to whom I would be valuable. My requirements in the way of salary would be moderate until I had proven my worth. Box 545, Canadian Machinery. (c4m)

FOREMAN PATTERNMAKER, TECHNICAL training. 20 years' experience in all classes of work. Foremen's references, covering past seven years. Age 36. Good executive. Energetic. Alive to latest methods. Box 146, Canadian Machinery. (c5m)

MECHANICAL AND STEAM ENGINEER open for appointment as plant engineer in an industrial plant or shipyard. Sound practical man with good initiative and executive ability, experienced in the maintenance and installation of medium and heavy machine tools, steam and air lines, transmission, etc. Age 37. Seventeen years' engineering experience, and held position as above in a large shipyard for seven years with marked success. Correspondence invited to Post Office Box 1965, Montreal. (c5m)

FIRST-CLASS MECHANIC, EDUCATED, MAR-ried. 15 years' experience in practice and technique, desires to connect in above capacity with firm manufacturing traction and other farm engines for South, Central America or West Indian trade, with view to travelling afterwards in their erection, demonstration or sales anywhere in above territory. Am native of West Indies and have travelled South America; know the language and people, hence possess an advantage. Highest references. Box 550, Canadian Machinery. (c7m)

SITUATIONS VACANT

WANTED A FIRST-CLASS DRAFTSMAN—one with experience on spiral and bevel cut gears preferred. State experience and salary expected. Apply McKinnon Industries, Ltd., St. Catharines, Ont. (c4m)

WANTED—FOREMAN FOR TANK SHOP employing 40 to 50 men. All classes of plate work, except boilers. Western Canada. Box 549, Canadian Machinery. (c5m)

MACHINE WORK WANTED

MACHINE WORK WANTED FOR LATHES, shapers, milling machine and planer, etc. Hourly or contract basis. Prompt delivery. W. H. Sumbling Machinery Co., Toronto. (ctfm)

PATTERNS

TORONTO PATTERN WORKS, 65 JARVIS Street, Toronto. Patterns in wood and metal for all kinds of machinery. (cfm)

FOR SALE

2 MOTOR DRIVEN COMPRESSORS, 329 FT. 2 Frog & Switch Planers. 2 Rail & Frog Fillet Multiple Drills. 2 Newton Cold Saws, Nos. 501 and 502. J. L. Neilson & Co., Winnipeg, Man. (ctfm)

ONE NEW NO. 2 WOODS ENGINEERING CO. make universal tool and cutter grinder, complete with full equipment. A bargain to a quick purchaser for cash. Canada Machinery Agency, 211 McGill St., Montreal, P.Q. (c6m)

ONE 3/16" ADT. MODEL AUTOMATIC WIRE straightener and cutting machine arranged to cut a maximum of 10 feet. E. M. Bride, 113 4th Ave. East, Calgary, Alberta. (c11m)

ONE SECOND-HAND JENCKES CORLISS EN-gine—12" x 30". Cut, description and price on application to Canadian Ingersoll-Rand Co., Limited, Toronto, Ont. (ctfm)

TWO NEW STEAM TURBINE BLOWERS for blast or cupola use. Size and particulars on application or can be seen running. Apply to Box 141, Tilbury, Ont. (c7m)

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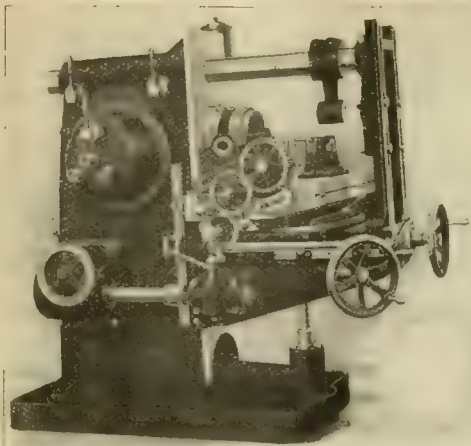
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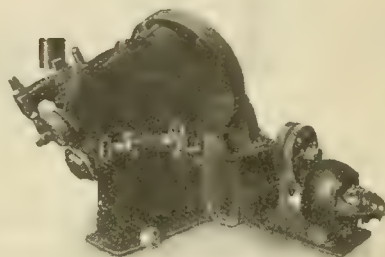
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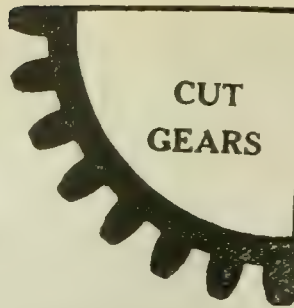
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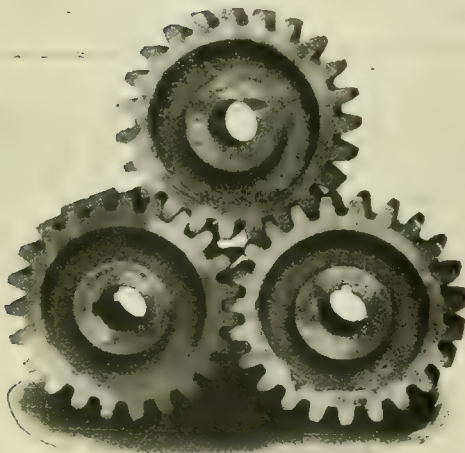
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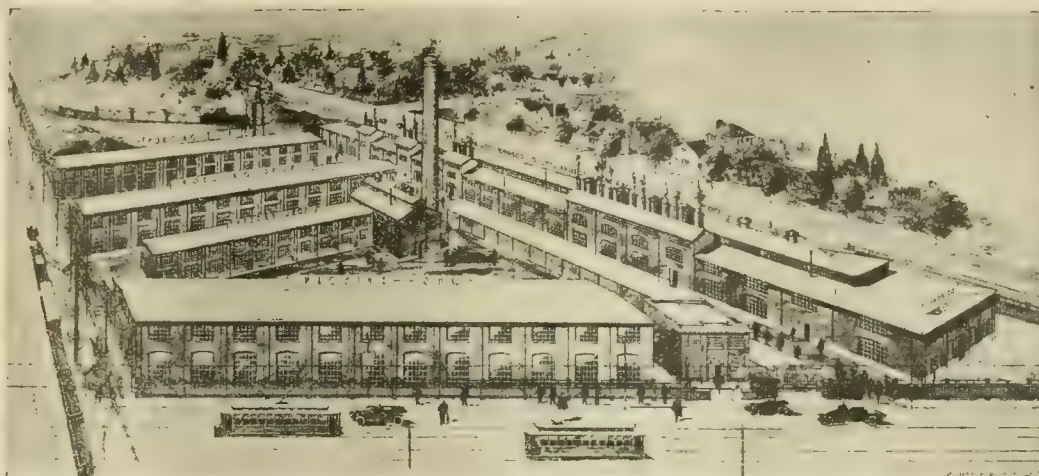
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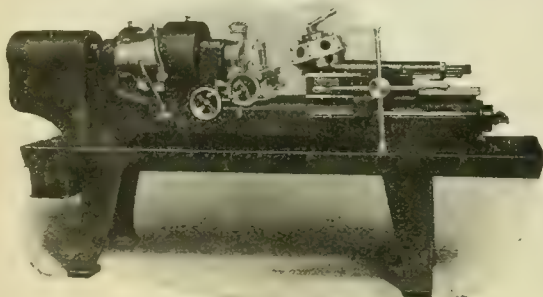
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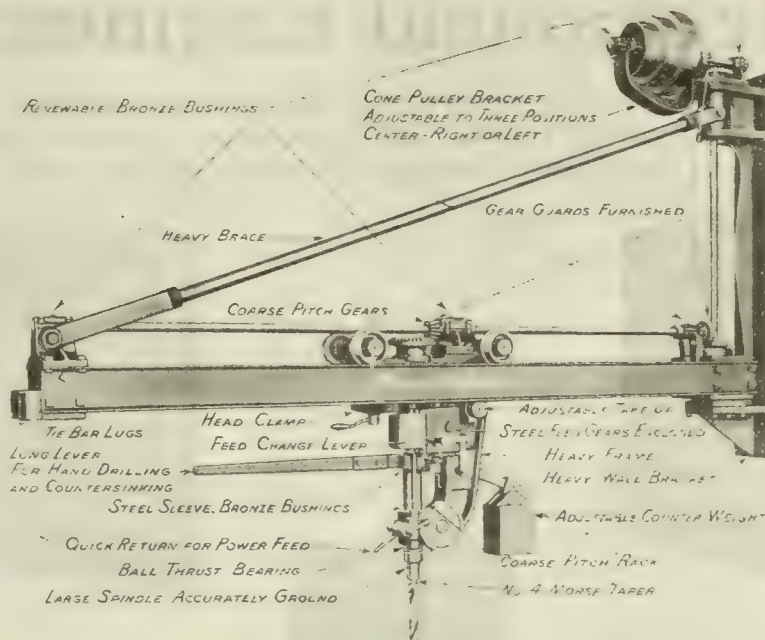
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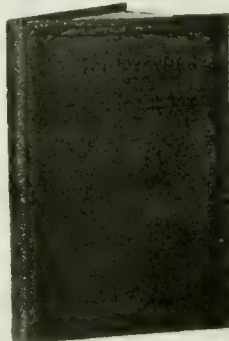


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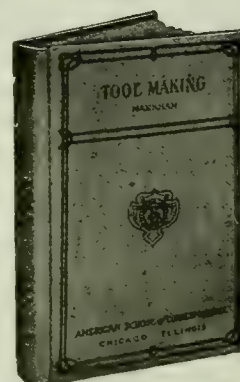
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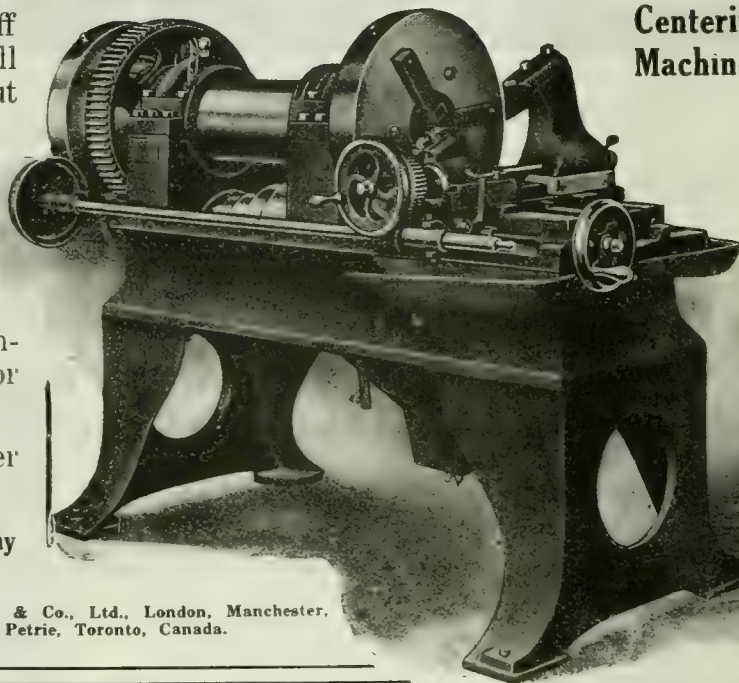
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Mulliner-Edlund Tool Co.,
Syracuse, N.Y.

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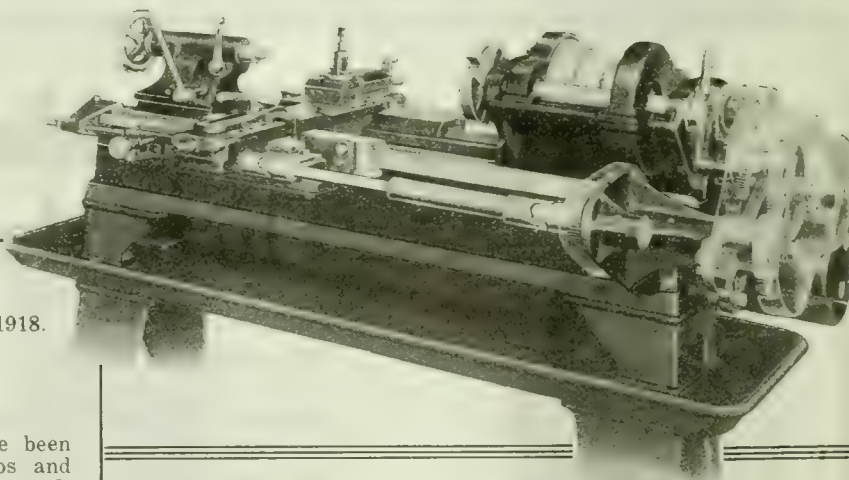
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With best wishes, we are,
Yours truly,

B. & W. TOOL & DIE CO.
By J. A. Walton

JAW/C"



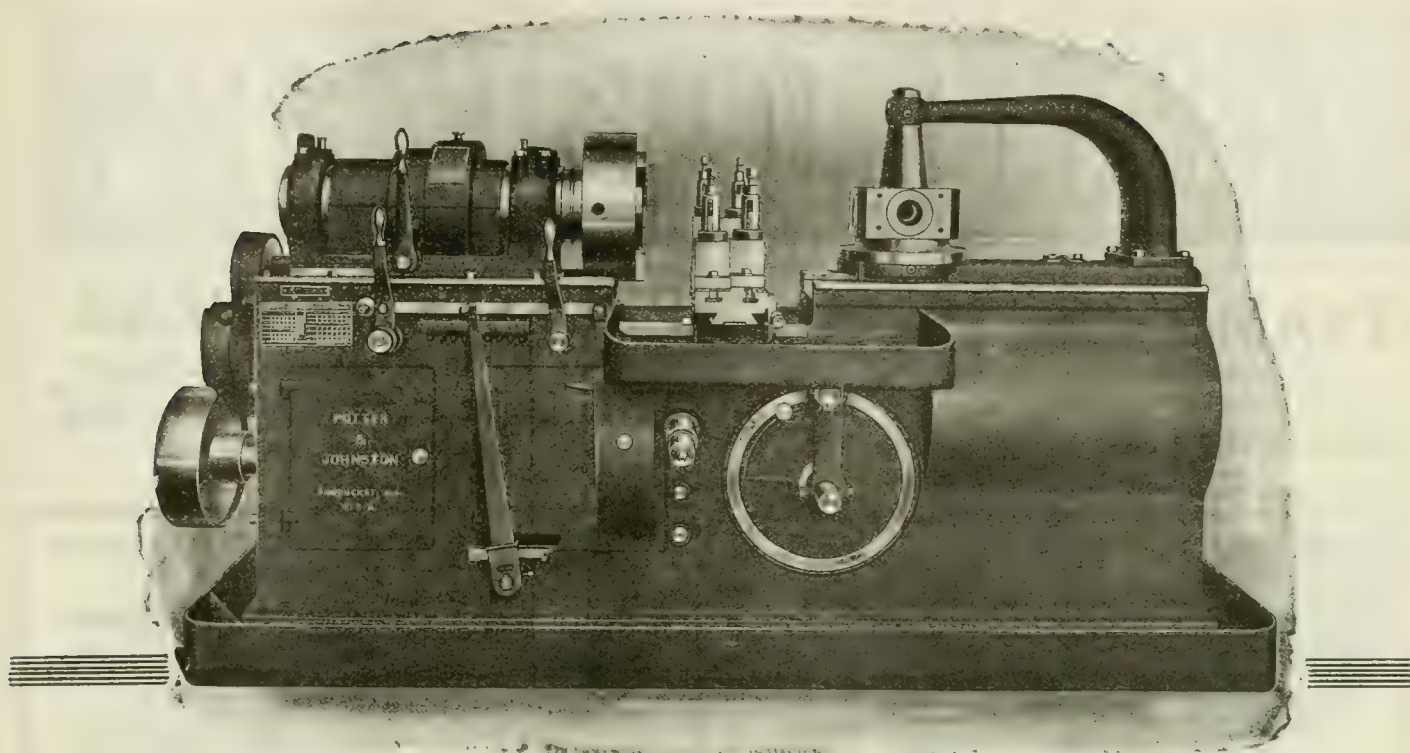
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DO IT AUTOMATICALLY

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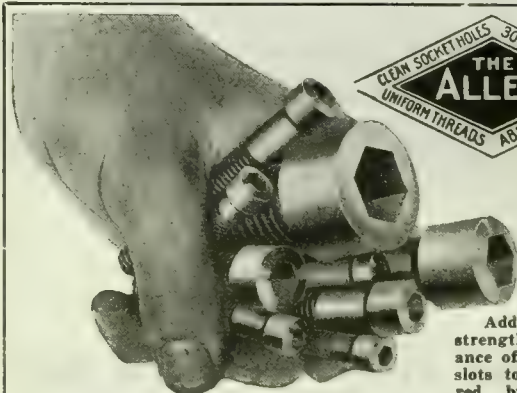


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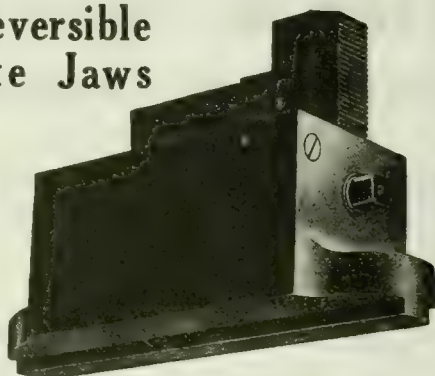
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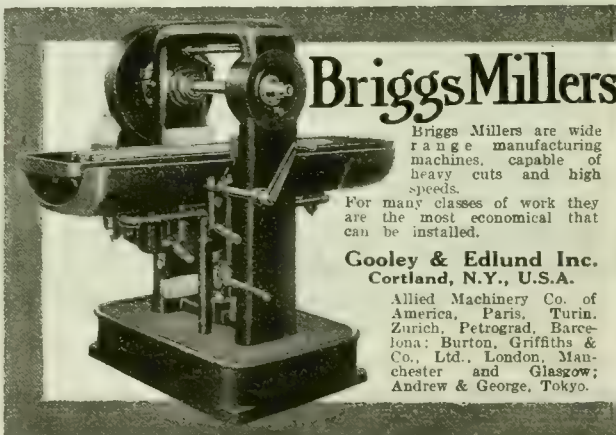
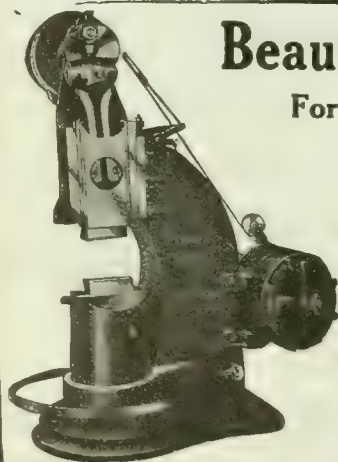
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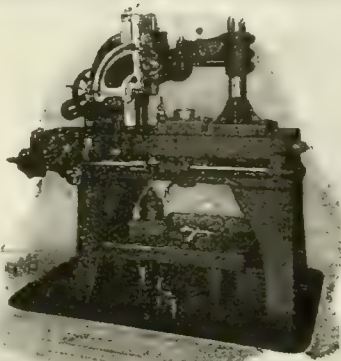
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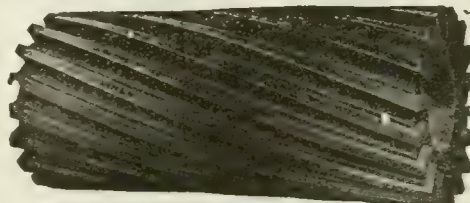
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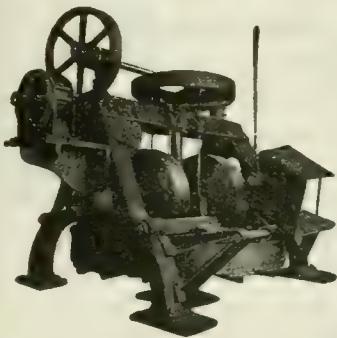
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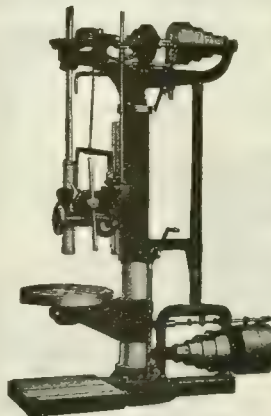
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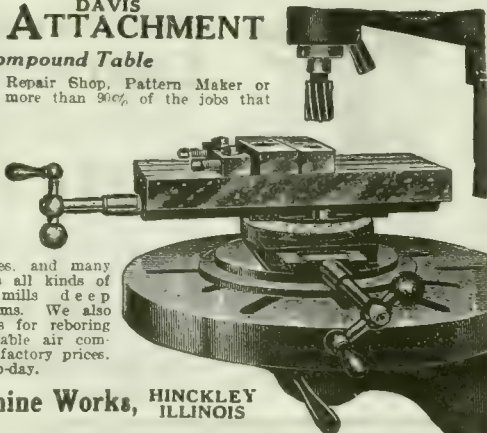
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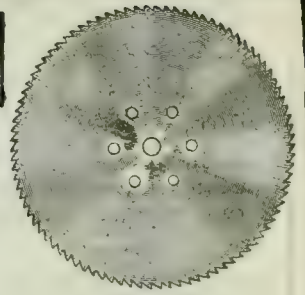
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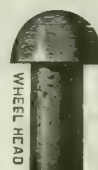
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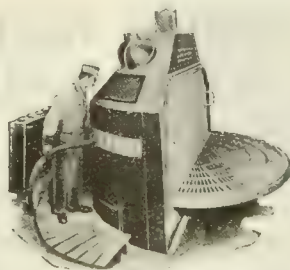
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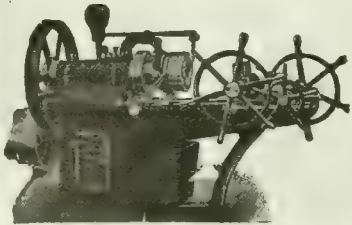
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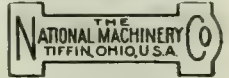
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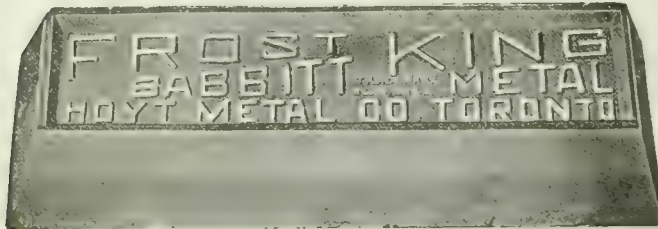
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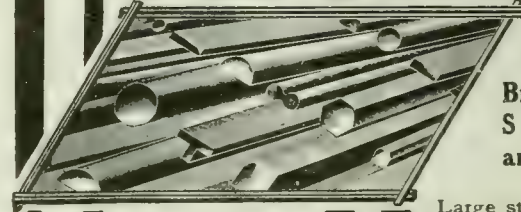
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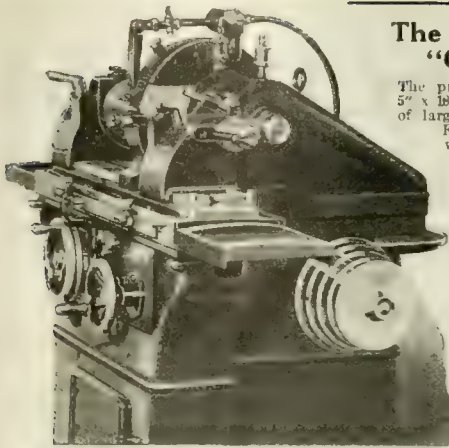
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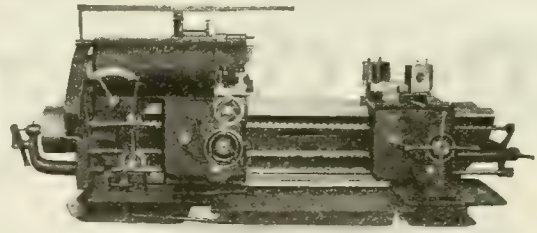
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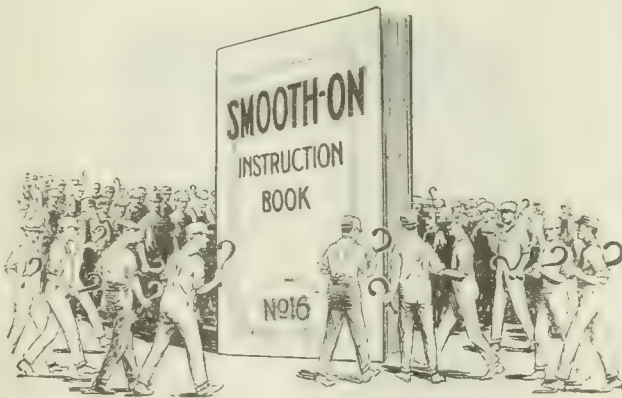
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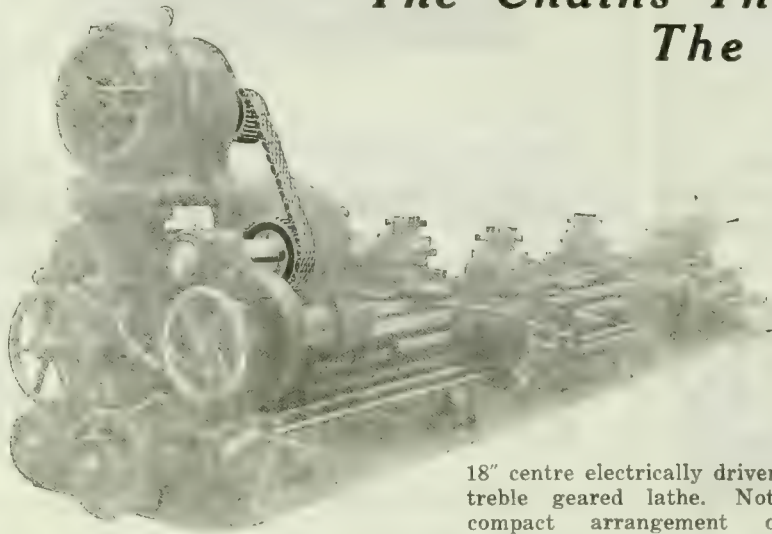
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Canadian Fairbanks-Morse Co., Montreal.
The Geo. F. Foss Mch'y. & Supply Co., Montreal.
Ford-Smith Mach. Co., Hamilton, Ont.
Norton Co., Worcester, Mass.
Plewes Ltd., Winnipeg, Man.
Pittsburgh Crushed Steel Co., Pittsburgh, Pa.
Rice, Lewis & Son, Toronto, Ont.

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Carter Welding Co., Toronto, Ont.
Canadian Welding Works, Montreal, Que.
Prest-O-Lite Co., Inc., Toronto, Ont.

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Prest-O-Lite Co., Inc., Toronto, Ont.

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Garlock-Walker Machinery Co., Toronto, Ont.
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Metalwood Mfg. Co., Detroit, Mich.
Niles-Bement-Pond Co., New York.

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AIR CYLINDERS

Smalley-General Co., Inc., Bay City, Mich.

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Sheldons, Ltd., Galt, Ont.

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United Brass & Lead, Ltd., Toronto.
Tallman Brass & Metal Co., Hamilton.

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Baker & Co., Inc., H., Montreal, Que.
Firth & Sons, Thos., Montreal, Que.
General Steel Co., Milwaukee, Wis.
Hawkrige Bros. Co., Boston, Mass.
Standard Alloys Company Pittsburgh, Pa.
Swedish Steel & Importing Co., Ltd., Montreal.
Vanadium Alloys Steel Co., Pittsburgh, Pa.
Vulcan Crucible Steel Co., Aliquippa, Pa.

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Welding Equipment
Arcwell Corporation of Can., Toronto, Ont.

ARBORS

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Cleveland Twist Drill Co., Cleveland.
Ford-Smith Machine Co., Hamilton, Ont.
J. C. Wilson & Co., Belleville, Ont.
Garlock-Walker Machinery Co., Toronto, Ont.
Morse Twist Drill & Mach. Co., New Bedford, Mass.
Pratt & Whitney Co., Dundas, Ont.

ARCHITECTURAL IRON

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Northern Crane Co., Walkerville, Ont.
Sheldons Ltd., Galt, Ont.
Whiting Foundry Equipment Co., Harvey, Ill.
Pangborn Corporation, Hagerstown, Md.

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Carter Welding Co., Toronto, Ont.
Prest-O-Lite Co., Inc., Toronto, Ont.
St. Lawrence Welding Co., Montreal, Que.

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Garlock-Walker Machinery Co., Toronto, Ont.
Gardner, Robt., & Son, Montreal.
National Acme Co., Cleveland, O., and Windsor.
Riverside Machinery Depot, Detroit, Mich.
Pratt & Whitney Co., Dundas, Ont.
Roelofsen Machine & Tool Co., Toronto, Can.
Williams Machy. Co., A. R., Toronto.
Williams & Wilson, Ltd., Montreal, Que.

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Canada Metal Co., Toronto.
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Fort Metal Co., Toronto.
Magnolia Metal Co., Montreal.
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Wilkinson & Kompass, Hamilton, Ont.

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Cleveland Wire Spring Co., Cleveland.

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Whiting Foundry Equipment Co., Harvey, Ill.

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Williams & Co., J. H., Brooklyn, N.Y.

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BARS, CONCRETE REINFORCING

Algoma Steel Corp., Sault Ste. Marie, Ont.

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Wentworth Mfg. Co., Hamilton, Ont.

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Foss Mch'y. & Supply Co., The Geo. F., Montreal.
Graton & Knight Mfg. Co., Worcester, Mass.
Rice, Lewis & Son, Toronto, Ont.

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Baxter & Co., Ltd., J. R., Montreal, Que.
Canadian Welding Works, Montreal, Que.
Federal Engineering Co., Toronto, Ont.

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Gutta Percha & Rubber, Ltd., Toronto, Can.

BELTING, CHAIN

Canadian Fairbanks-Morse Co., Montreal.
Can. Link-Belt Co., Toronto, Ont.
Jones & Glasco, Montreal, Que.
Morse Chain Co., Ithaca, N.Y.
Whitney Mfg. Co., Hartford, Conn.

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Jones & Glasco, Montreal, Que.
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Dominion Belting Co., Hamilton, Ont.

Gutta Percha & Rubber, Ltd., Toronto, Can.

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Federal Engineering Co., Ltd., Toronto, Ont.

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New Britain Mach. Co., New Britain, Conn.

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Dominion Bridge Co., Montreal, Que.
MacKinnon Steel Co., Sherbrooke, Que.
Toronto Iron Works, Ltd., Toronto, Ont.

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STEEL GRIT

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Landis Machine Co., Waynesboro, Pa.
Rice, Lewis & Son, Toronto, Ont.
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Rice, Lewis & Son, Toronto, Ont.
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Wilkinson & Kompass, Hamilton, Ont.
Williams & Co., J. H., Brooklyn, N.Y.

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Garlock-Walker Machinery Co., Toronto, Ont.
Gardner & Son, Robt., Montreal.
Landis Machine Co., Waynesboro, Pa.
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National Machinery Co., Tiffin, Ohio.
Riverside Machinery Depot, Detroit, Mich.
Williams Machinery Co., A. R., Toronto.
Williams & Wilson, Ltd., Montreal, Que.

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Landis Machine Co., Waynesboro, Pa.
National Acme Co., Cleveland, Ohio.
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Garlock-Walker Machinery Co., Toronto, Ont.
Giddings & Lewis Mfg. Co., Fond du Lac, Wis.
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Marsh Engineering Works, Belleville, Ont.
Sheldons, Limited, Galt, Ont.
Whiting Foundry Equipment Co., Harvey, Ill.

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Marsh Engineering Works, Belleville, Ont.

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Wilson & Co., J. C., Belleville, Ont.

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Greenleafs, Ltd., Belleville, Ont.
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St. Lawrence Welding Co., Montreal, Que.
Tallman Brass & Metal Co., Hamilton, Ont.
United Brass & Lead Ltd., Toronto.
Wentworth Mfg. Co., Hamilton, Ont.

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Tollard Mfg. Co., Montreal, Que.

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CENTERING MACHINES

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Rice Lewis & Son, Toronto, Ont.
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Coventry Chain Co., Coventry, England.
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CHESTS, TOOL

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J. F. A. Comstock, New York City, N.Y.
General Steel Co., Milwaukee, Wis.

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Ker & Godwin, Brantford.
Knight Metal Products, Ltd., Toronto, Ont.
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An article of unusual importance, by Sir George Bury, formerly vice-president of the C.P.R., appears in the February issue of MACLEAN'S. He points out that Canada must more definitely shape her destiny if that destiny is to be as glorious as all Canadians hope. It is a stirring demand for Canadians to get together in the formation of a national plan, accompanied by many practical suggestions from his experience in transcontinental railroad building. An article of national importance.

"Germany From Within To-day"

The funniest thing that he has perhaps written appears in February MACLEAN'S from the pen of Canada's great humorist, Stephen Leacock—an imaginary visit to Berlin under the Bolsheviks. He finds Von Tirpitz planning a new navy, an *inland fleet*; Frau Krupp, an apple woman; Von Bethmann-Hollweg, a cab driver; Bernstorff, a Bolshevik and president of the Scavengers Union. He finds a *Get From Under* committee planning a trade war on the world and half the population of Berlin in English clothing or Scotch kilts. He finds—

But read the article. There's a long laugh in every line. It is farce, however, built up on pretty shrewd truths.

You will find this a remarkably interesting number. The bold, fighting face of Admiral Beatty is on the cover and inside are the following big features:

The Campaign Against Britain, by Agnes C. Laut.

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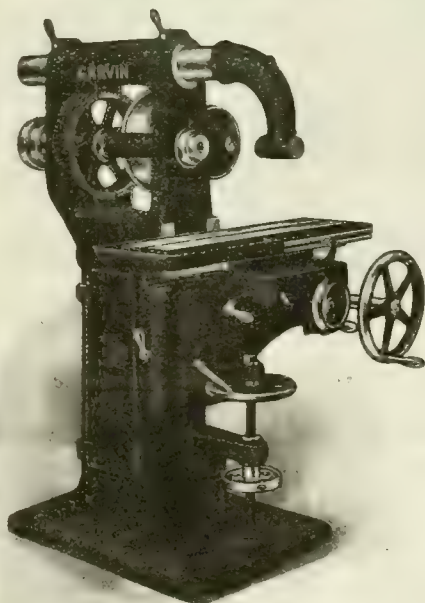
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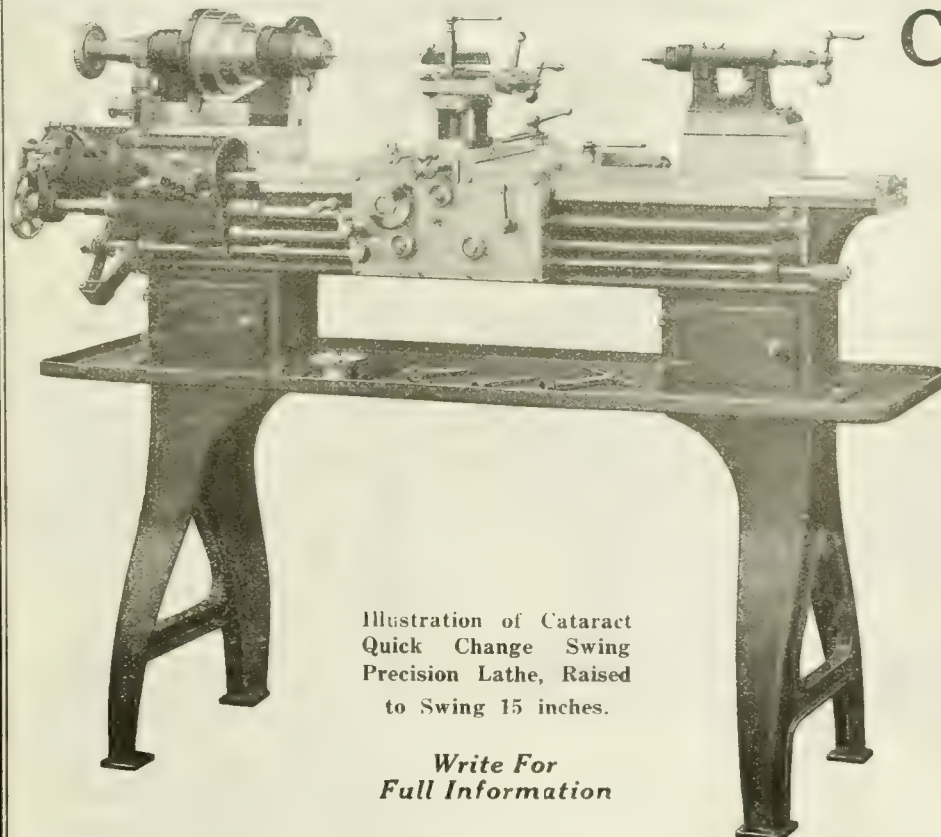


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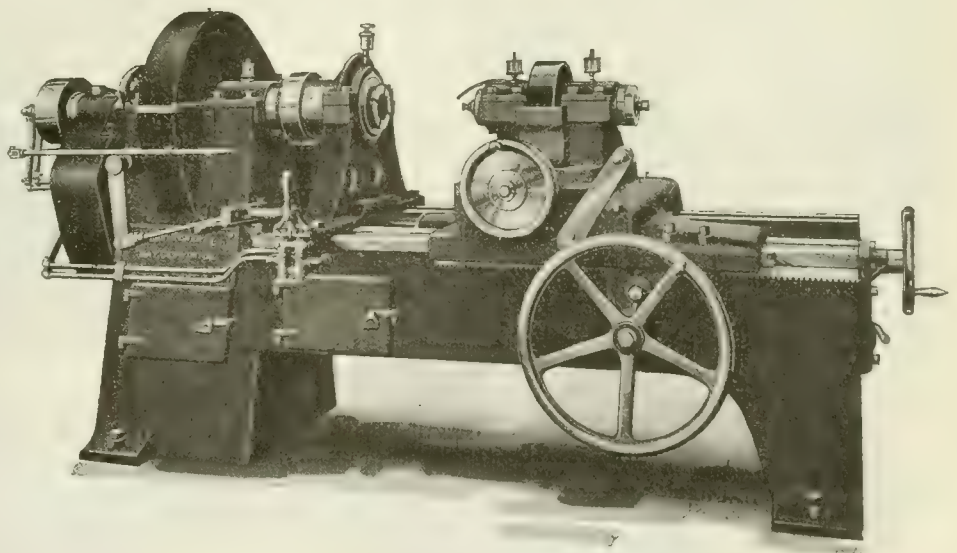
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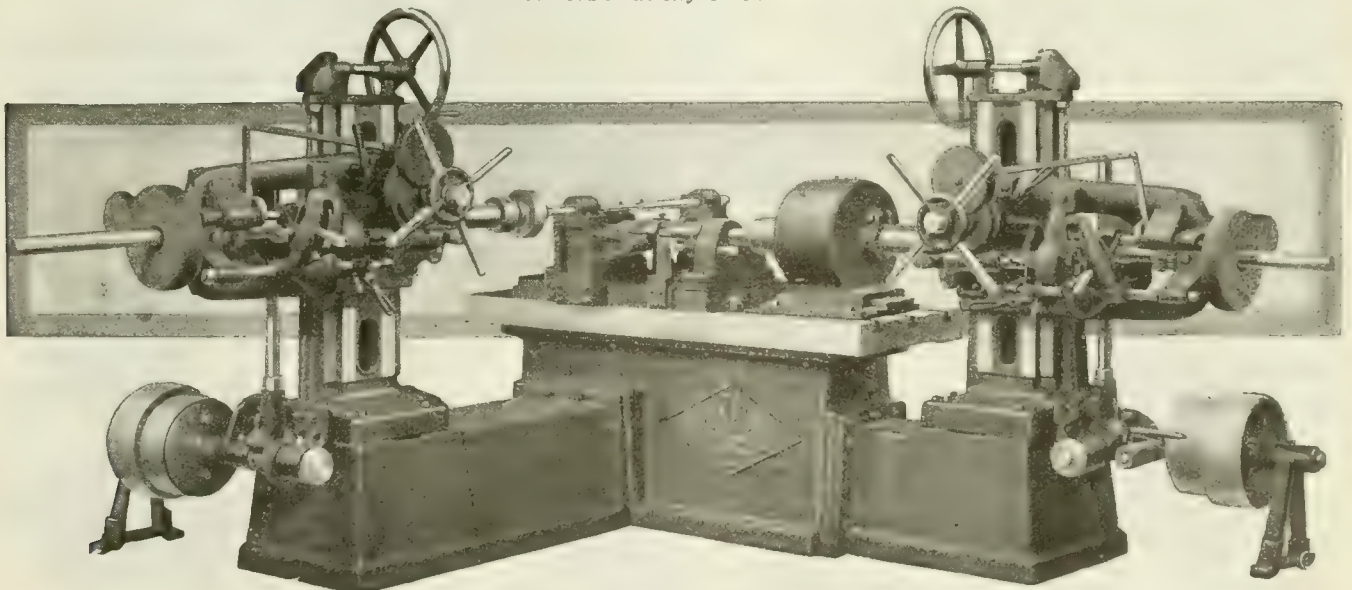
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NUT FACING AND BOLT SHAVING MACHINES

Garvin Machine Co., New York.
National Machinery Co., Tiffin, Ohio.
Victor Tool Co., Waynesboro, Pa.

NUT TAPPERS

Bertram, John, & Sons Co., Dundas Ont.
Canada Machinery Corp., Galt, Ont.
Garvin Machine Co., New York.
Greenfield Tap & Die Corp., Greenfield, Mass.
Hall, J. H., & Son, Brantford, Ont.
A. B. Jardine & Co., Hespeler.
Landis Machine Co., Waynesboro, Pa.
National Machinery Co., Tiffin, Ohio.

OILS, MOTOR

Elm Cutting Oil Co., Toronto, Ont.

OILS, DRAWING

Elm Cutting Oil Co., Toronto, Ont.

OIL SEPARATORS

Can. Fairbanks-Morse Co., Montreal.
Sheldons, Ltd., Galt, Ont.
Smart-Turner Machine Co., The, Hamilton.

OIL STONES

Aikenhead Hardware Co., Toronto, Ont.
Carborundum Co., Niagara Falls, N.Y.
Norton Co., Worcester, Mass.
Rice Lewis & Son, Toronto, Ont.

OIL STORAGE SYSTEMS

Bowser & Co., Inc., S. F., Toronto, Ont.

OPTICAL SUPPLIES

Consolidated Optical Co., Toronto, Ont.

OSCILLATING VALVE GRINDERS (PNEUMATIC)

Cleveland Pneumatic Tool Co. of Can., Toronto

OVENS FOR BAKING, BLUING, DRYING, ENAMELING, JAPANNING AND**LACQUERING**

Brantford Oven & Rack Co., Brantford, Ont.
Whiting Foundry Equipment Co., Harvey, Ill.

OVEN TRUCKS, STEEL

Brantford Oven & Rack Co., Brantford, Ont.
MacKinnon Steel Co., Sherbrooke, Que.
Whiting Foundry Equipment Co., Harvey, Ill.

OVENS FOR DRYING, TEMPER AND UNDER TRUCKS

Brantford Oven & Rack Co., Brantford, Ont.

OXY-ACETYLENE WELDING AND CUTTING

Can. Welding Works, Montreal, Que.
Carter Welding Co., Toronto, Ont.
Prest-O-Lite Co., Inc., Toronto, Ont.
St. Lawrence Welding Co., Montreal, Que.

OXY-ACETYLENE WELDING AND CUTTING PLANT

Carter Welding Co., Toronto, Ont.
Prest-O-Lite Co., Inc., Toronto, Ont.
Oxyweld Co., Ltd., Toronto, Ont.

OXYGEN (SEE ACETYLENE)

Canadian Welding Works, Montreal, Que.

PACKINGS, ASBESTOS

Canadian Welding Works, Montreal, Que.
Cleveland Wire Spring Co., Cleveland.
New Britain Mach. Co., New Britain, Conn.

PACKINGS, LEATHER, HYDRAULICS, ETC.

Baxter & Co., Ltd., J. R., Montreal, Que.
Giaton & Knight Mfg. Co., Worcester, Mass.
Gutta Percha & Rubber, Ltd., Toronto, Can.
William R. Perrin, Ltd., Toronto.

PANS, WET AND DRY

Frost Mfg. Co., Chicago, Ill.

PAPER MILL CONVEYORS AND DRIVES

Can. Link-Belt Co., Toronto, Ont.

PAPER MILL MACHINERY

Bertrams, Ltd., Edinburgh, Scotland.
Hydraulic Machy. Co., Ltd., Montreal, Que.
MacKinnon Steel Co., Sherbrooke, Que.

PATTERN SHOP EQUIPMENT

Canada Machinery Corp., Galt, Ont.
Fox Machine Co., Jackson, Mich.
Garlock-Walker Machinery Co., Toronto, Ont.

PATENT SOLICITORS

Budden, Hanbury A., Montreal.
Fetherstonhaugh & Co., Ottawa.
Marion & Marion, Montreal.
Ridout & Maybee, Toronto.
Dominion Pattern Works, Toronto, Ont.
J. C. Wilson & Co., Belleville, Ont.
Greenleafs Ltd., Belleville, Ont.
Marten Machine Co., Hamilton, Ont.

PECK CARRIERS FOR POWER PLANTS

Can. Link-Belt Co., Toronto, Ont.

PERFORATED METALS AND**ORNAMENTAL IRON GOODS**

Canada Wire & Iron Goods Co., Hamilton

PIG IRON

Hanna & Co., M. A., Cleveland, O.
Steel Co. of Canada, Ltd., Hamilton, Ont.

PIPE FITTINGS, MALLEABLE AND CAST IRON

International Malleable Iron Co., Guelph, Ont.

PIPE CUTTING AND THREADING MACHINES

Butterfield & Co., Rock Island, Que.
Can. Fairbanks-Morse Co., Montreal.
Curtis & Curtis Co., Bridgeport, Conn.
Fox Machine Co., Jackson, Mich.
Garlock-Walker Machinery Co., Toronto Ont.
Garvin Machine Co., New York.
John H. Hall & Sons, Brantford.
A. B. Jardine & Co., Hespeler, Ont.
Landis Machine Co., Waynesboro, Pa.
R. McDougall Co., Galt.
Wells Bros. Co. of Canada, Galt, Ont.
Williams Tool Co., Erie, Pa.
A. R. Williams Machy. Co., Toronto.

PHOTOSTATS

Commercial Camera Co., Providence, R.I.

PIPE RIVETED STEEL

Toronto Iron Works, Ltd., Toronto.

PIPE CUTTERS, ROLLING

Curtis & Curtis Co., Bridgeport, Conn.
John H. Hall & Sons, Ltd., Brantford, Ont.
Wells Bros. Co. of Canada, Galt, Ont.

PISTON RODS, ROUGH TURNED

General Steel Co., Milwaukee, Wis.

PISTON AND PISTON RING MACHINES

National Acme Co., Windsor, Vt.

PLANER JACKS

Armstrong Bros. Tool Co., Chicago.

PLANERS, STANDARD AND ROTARY

Betts Machine Co., Rochester, N.Y.
John Bertram & Sons Co., Dundas.
Canada Machinery Corp., Galt, Ont.
Can. Fairbanks-Morse Co., Montreal.
The Geo. F. Foss Mch. & Supply Co., Montreal.
Gardner, Robt., & Son, Montreal.
Garlock-Walker Machinery Co., Toronto, Ont.
Garvin Machine Co., New York.
Hamilton Machine Tool Co., Hamilton, Ohio.
Morton Mfg. Co., Muskegon Heights, Mich.
Niles-Bement-Pond Co., New York.
Whitcomb-Blaisdell Mach. Tool Co., Worcester, Mass.

PLANING AND SHAPING MACHINERY

Canada Machinery Corp., Galt, Ont.
Can. Fairbanks-Morse Co., Montreal.
The Geo. F. Foss Mch. & Supply Co., Montreal.
Garlock-Walker Machinery Co., Toronto, Ont.
Garvin Machine Co., New York.
Hamilton Machine Tool Co., Hamilton, Ohio.
Niles-Bement-Pond Co., New York.
Riverside Machinery Depot, Detroit, Mich.
Stephens, The John Co., Cincinnati, Ohio.
A. R. Williams Machy. Co., Toronto.
Williams & Wilson, Ltd., Montreal, Que.

PLANER-SHAPER, COMBINED OPEN SIDE

Lynd-Farquhar Co., Boston.

POWER TRANSMISSION MACHINERY

Manitoba Bridge & Iron Wks., Ltd., Wpg., Can.
Can. Blower & Forge Co., Kitchener, Ont.
Sheldons, Ltd., Galt, Ont.
MacGovern & Co., Montreal, Que.
Niles-Bement-Pond Co., New York.

POLE SAW FRAMES

Manitoba Bridge & Iron Wks., Ltd., Wpg., Can.

PLIERS

Aikenhead Hardware Co., Toronto.
Canadian Billings & Spencer, Ltd., Welland.
Peck, Stow & Wilcox Co., Southington, Conn.
Rice Lewis & Son, Toronto, Ont.

POLE LINE HARDWARE

Manitoba Bridge & Iron Wks., Ltd., Wpg., Can.

POWER CRANES, HAND

MacKinnon Steel Co., Sherbrooke, Quebec.

PLATE AND TANK CONSTRUCTION

Manitoba Bridge & Iron Wks., Ltd., Wpg., Can.

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Ford-Smith Machine Co., Hamilton, Ont.

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Morris Crane & Hoist Co., Herbert, Niagara Falls, Ont.

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Metalwood Mfg. Co., Detroit, Mich.

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AND FLANGING

Atlas Press Co., Kalamazoo, Mich.

E. W. Bliss Co., Brooklyn, N.Y.

Ferracute Machine Co., Bridgeton, N.J.

Metalwood Mfg. Co., Detroit, Mich.

Toledo Machine & Tool Co., Toledo.

Stoll Co., D. H., Buffalo, N.Y.

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Baird Machine Co., Bridgeport, Conn.

Bliss Co., E. W., Brooklyn, N.Y.

Consolidated Press Co., Hastings, Mich.

Toledo Machine & Tool Co., Toledo.

Stoll Co., D. H., Buffalo, N.Y.

PRESSES FOR SHELLS

Atlas Press Co., Kalamazoo, Mich.

Bliss Co., E. W., Brooklyn, N.Y.

Ferracute Machine Co., Bridgeton, N.J.

The Geo. F. Foss Mch. & Supply Co., Montreal

Garlock-Walker Machinery Co., Toronto, Ont.

Hydraulic Machy. Co., Ltd., Montreal, Que.

Metalwood Mfg. Co., Detroit, Mich.

William R. Perrin, Ltd., Toronto.

Stoll Co., D. H., Buffalo, N.Y.

West Tire Setter Co., Rochester, N.Y.

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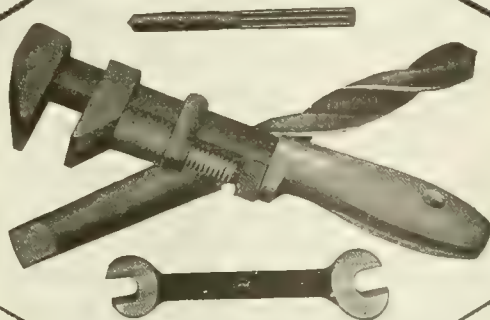
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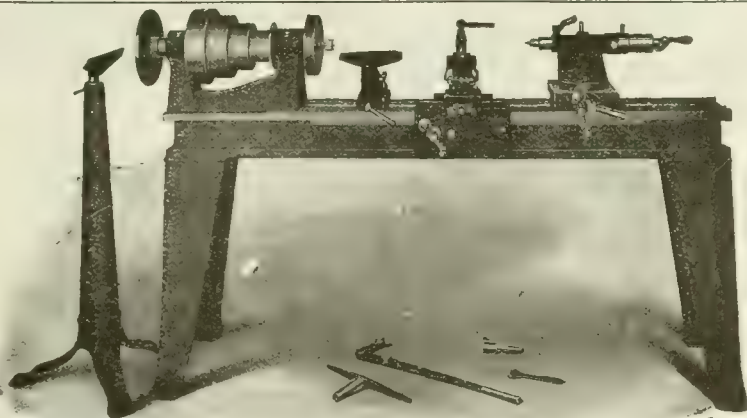
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Niles-Bement-Pond Co., New York.
William R. Perrin, Ltd., Toronto.
Standard Machy. & Supplies, Ltd., Montreal, Que.
Toledo Machine & Tool Co., Toledo.
Stoll Co., Inc., D. H., Buffalo, N.Y.
West Tire Setter Co., Rochester, N.Y.
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Consolidated Press Co., Hastings, Mich.
Ferracute Machine Co., Bridgeton, N.J.
Garlock-Walker Machinery Co., Toronto, Ont.
Hydraulic Machy. Co., Ltd., Montreal, Que.
William R. Perrin, Ltd., Toronto.
Riverside Machinery Depot, Detroit, Mich.
Stoll Co., D. H., Buffalo, N.Y.
Toledo Machine & Tool Co., Toledo.
A. R. Williams Machy. Co., Toronto.
Williams & Wilson, Ltd., Montreal, Que.

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Bliss Co., E. W., Brooklyn, N.Y.
Brown, Boggs & Co., Hamilton, Ont.
Consolidated Press Co., Hastings, Mich.
Toledo Machine & Tool Co., Toledo.

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Barnes, W. F., & John Co., Rockford, Ill.
Bliss Co., E. W., Brooklyn, N.Y.
Ferracute Mach. Co., Bridgeton, N.J.
William R. Perrin, Ltd., Toronto.

PRESSES, TRIMMING

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Canada Machinery Corp., Galt, Ont.
Consolidated Press Co., Hastings, Mich.
Erie Foundry Co., Erie, Pa.
Ferracute Mach. Co., Bridgeton, N.J.
Stoll Co., D. H., Buffalo, N.Y.

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PSYCOMETERS, SLING

Taylor Instrument Co., Rochester, N.Y.

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American Pulley Co., Philadelphia.
Baird Machine Co., Bridgeport, Conn.
Bernard Industrial Co., Fortierville, Que.
Brown & Sharpe Mfg. Co., Providence, R.I.
Can. Fairbanks-Morse Co., Montreal.
Dodge Sales & Eng. Co., Mishamsha, Ind.
Ford-Smith Machine Co., Hamilton, Ont.
Wm. Kennedy & Sons, Ltd., Owen Sound, Ont.
Positive Clutch & Pulley Works, Ltd., Toronto.
J. C. Wilson & Co., Belleville, Ont.
Standard Machy. & Supplies, Ltd., Montreal, Que.
A. R. Williams Machy. Co., Toronto.
Williams & Wilson, Ltd., Montreal, Que.

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Baird Machine Co., Bridgeport, Conn.
Bernard Industrial Co., A., Fortierville, Que.
Can. Link-Belt Co., Toronto, Ont.
Carlyle Johnson Mach. Co., Manchester, Conn.
Positive Clutch & Pulley Works, Ltd., Toronto.
Jones & Glasco, Montreal.
Johnson, Carlyle, Mach. Co., Manchester, Conn.

PULP MILL MACHINERY

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Can. Ingersoll-Rand Co., Montreal, Que.
Darling Bros., Ltd., Montreal, Quebec
M. L. Oberdorfer Brass Co., Syracuse, N.Y.
Pratt & Whitney Co., Dundas, Ont.
Sheldons, Ltd., Galt, Ont.

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Bowser & Co., Inc., S. F., Toronto, Ont.
Darling Bros., Ltd., Montreal, Quebec
Trabern Pump Co., Rockford, Ill.

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Darling Bros., Ltd., Montreal, Quebec.
M. L. Oberdorfer Brass Co., Syracuse, N.Y.
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PUMPS, HIGH PRESSURE

Hydraulic Machy. Co., Ltd., Montreal, Que.
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PUMPS, ALL KINDS

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M. L. Oberdorfer Brass Co., Syracuse, N.Y.
William R. Perrin, Ltd., Toronto.

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Darling Bros., Ltd., Montreal, Quebec
Hydraulic Machy. Co., Ltd., Montreal, Que.
Metalwood Mfg. Co., Detroit, Mich.
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PUNCHING MACHINES, HORIZONTAL

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PIROMETERS

Taylor Instrument Co., Rochester, N.Y.
Thwing Instrument Co., Philadelphia, Pa.

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Niles-Bement-Pond Co., New York.

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United Brass & Lead, Ltd., Toronto, Ont.

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Niles-Bement-Pond Co., New York.

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Garlock-Walker Machinery Co., Toronto, Ont.
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RAIL OVERHEAD

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Plewes, Ltd., Winnipeg, Man.

REAMERS, ADJUSTABLE

Pratt & Whitney Co., Dundas, Ont.
Standard Machy. & Supplies, Ltd., Montreal, Que.

REAMERS, ADJUSTABLE

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Taylor, J. A. M., 318 Stair Bldg., Toronto, Ont.

REAMERS, ADJUSTABLE

Whitman & Barnes Mfg. Co., St. Catharines, Ont.
Will Twist Drill Co., Walkerville, Ont.

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AND LOCOMOTIVE

REAMERS, PIPE, CYLINDER

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Can. Fairbanks-Morse Co., Montreal.

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Cleveland Twist Drill Co., Cleveland.
Kelly Reamer Co., Cleveland, O.

REAMERS, PIPE, CYLINDER

Morse Twist Drill & Mch. Co., New Bedford, Mass.
Pratt & Whitney Co., Dundas, Ont.

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Can. Fairbanks-Morse Co., Montreal.

REAMERS, PIPE, CYLINDER

Can. Fairbanks-Morse Co., Montreal.

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CLEVELAND TWIST DRILL CO., CLEVELAND

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CLEVELAND TWIST DRILL CO., CLEVELAND

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CLEVELAND TWIST DRILL CO., CLEVELAND

Pratt & Whitney Co., Dundas, Ont.

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Garvin Machine Co., New York.

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RECORDING INSTRUMENTS

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REGULATORS, PRESSURE

TEMPERATURE

REGULATORS, PRESSURE

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REGULATORS, PRESSURE

Taylor Instrument Co., Rochester, N.Y.

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RIVETS, TUBULAR, BIFURCATED

Parmenter & Bulloch Co., Gananoque.

RIVETS, TUBULAR, BIFURCATED

Rice Lewis & Son, Toronto, Ont.

RIVETS, TUBULAR, BIFURCATED

Steel Co. of Canada, Ltd., Hamilton, Ont.

RIVETS, IRON, COPPER AND BRASS

Aikenhead Hardware Co., Toronto, Ont.

RIVETS, IRON, COPPER AND BRASS

Manitoba Bridge & Iron Wks., Ltd., Wpg., Can.

RIVETS, IRON, COPPER AND BRASS

Parmenter & Bulloch Co., Gananoque.

RIVETERS, PNEUMATIC, HYDRAULIC

Rice, Lewis & Son, Toronto, Ont.

RIVETERS, PNEUMATIC, HYDRAULIC

Steel Co. of Canada, Ltd., Hamilton, Ont.

HAMMER, COMPRESSION

Can. Fairbanks-Morse Co., Montreal.

HAMMER, COMPRESSION

Can. Ingersoll-Rand Co., Montreal.

HAMMER, COMPRESSION

Cleveland Pneumatic Tool Co. of Canada, Toronto

HAMMER, COMPRESSION

Garlock-Walker Machinery Co., Toronto, Ont.

HAMMER, COMPRESSION

Independent Pneumatic Tool Co., Chicago, Ill.

HAMMER, COMPRESSION

Niles-Bement-Pond Co., New York.

RIVETING MACHINES, ELASTIC

ROTARY BLOW

RIVETING MACHINES, ELASTIC

Grant Mfg. & Machine Co., Bridgeport, Conn.

RIVETING MACHINES, ELASTIC

High-Speed Hammer Co., Rochester, N.Y.

RIVETING MACHINES, ELASTIC

F. B. Shuster Co., New Haven, Conn.

ROAD BUILDING EQUIPMENT

Manitoba Bridge & Iron Wks., Ltd., Wpg., Can.

ROAD BUILDING EQUIPMENT

RODS

ROAD BUILDING EQUIPMENT

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ROLLER CHAINS

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ROLLS, BENDING AND STRAIGHTENING

Brown, Boggs Co., Ltd., Hamilton, Canada.

ROLLS, BENDING AND STRAIGHTENING

Canada Machinery Corp., Galt, Ont.

ROLLS, BENDING AND STRAIGHTENING

Garlock-Walker Machinery Co., Toronto, Ont.

ROLLS, BENDING AND STRAIGHTENING

Niles-Bement-Pond Co., New York.

ROLLS, BENDING AND STRAIGHTENING

Toledo Machine & Tool Co., Toledo, O.

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Electric Steels & Metals, Ltd., Welland, Ont.

ROOF COOLERS

ROLLS, CRUSHING

ROOF COOLERS

Can. Link-Belt Co., Toronto.

RUBBER MILL DRIVES

Can. Link-Belt Co., Toronto, Ont.

RUBBER MILL DRIVES

RUBBER MILL MACHINERY

Bertrams, Ltd., Edinburgh, Scotland.

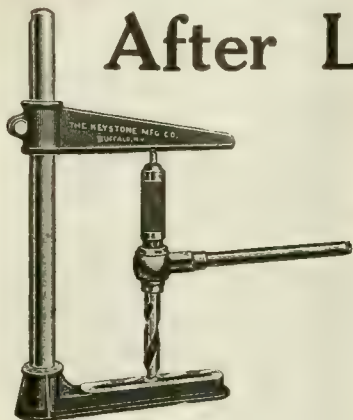
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Brown & Sharpe Mfg. Co., Providence.

RULES

James Chesterton & Co., Ltd., Sheffield, Eng

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CONSTRUCTION
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NO GRIT RETURNED
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 New Britain Machine Co., New Britain, Conn.
 Pratt & Whitney Co., Dundas, Ont.
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 A. B. Jardine & Co., Limited, Hespeler, Ont.
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 West Five Sifter Co., Rochester, N.Y.

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 National Acme Co., Cleveland, Ohio.
 Niles-Bement-Pond Co., New York.
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 Marsh Engineering Works, Belleville, Ont.

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Brown & Sharpe Mfg. Co., Providence.
 Cleveland Twist Drill Co., Cleveland.
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 Modern Tool Co., Erie, Pa.
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 Canada Machinery Corp., Galt, Ont.
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 Vanadium-Alloys Steel Co., Pittsburgh, Pa.
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 Marshall & Co., Geo., Toronto, Ont.
 Firth & Sons, Thos., Montreal, Que.
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 Illingworth Steel Co., John, New York, N.Y.
 Latrobe Electric Steel Co., Latrobe, Pa.
 Plewes, Ltd., Winnipeg, Man.
 Rice Lewis & Son, Toronto, Ont.
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 Swedish Steel & Importing Co., Ltd., Montreal.
 Vanadium-Alloys Steel Co., Pittsburgh, Pa.
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Dominion Forge & Stamping Co., Walkerville.

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Rickert-Shafer Co., Erie, Pa.

National-Acme Co., Cleveland, Ohio.

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Modern Tool Co., Erie, Pa.

Murphy Machine & Tool Co., Detroit.

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The Geo. F. Foss Mch. & Supply Co., Montreal.

Geometric Tool Co., New Haven.

A. B. Jardine & Co., Hespeler, Ont.

Landis Machine Co., Waynesboro, Pa.

Morse Twist Drill & Mch. Co., New Bedford, Mass.

Murphy Machine & Tool Co., Detroit.

Pratt & Whitney Co., Dundas, Ont.

Rice, Lewis & Son, Toronto, Ont.

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Wells Bros. Co. of Canada, Galt, Ont.

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Taylor Instrument Co., Rochester, N.Y.

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Taylor Instrument Co., Rochester, N.Y.

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Gisholt Machine Co., Madison, Wis.

Modern Tool Co., Erie, Pa.

Pratt & Whitney Co., Dundas, Ont.

Rice, Lewis & Son, Toronto, Ont.

Williams & Co., J. H., Brooklyn, N.Y.

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Williams & Co., J. H., Brooklyn, N.Y.

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Can. B. K. Morton, Toronto, Montreal.

Deloro Smelting & Refining Co., Toronto, Ont.

General Steel Co., Milwaukee, Wis.

H. A. Drury Co., Montreal.

Firth & Sons, Thos., Montreal, Que.

Hammond Steel Co., Inc., Syracuse, N.Y.

Harvey & Co., Arthur C., Boston, Mass.

Hawthorne Bros. Co., Boston, Mass.

Latrobe Electric Steel Co., Latrobe, Pa.

Marshall & Co., Geo., Toronto, Ont.

Rice, Lewis & Son, Toronto, Ont.

Vanadium-Alloys Steel Co., Pittsburgh, Pa.

Vulcan Crucible Steel Co., Alliquippa, Pa.

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Coventry Chain Co., Coventry, England.

Hamilton Gear & Machine Co., Toronto.

Jones & Glasco, Montreal.

Kennedy & Sons, Wm., Owen Sound, Ont.

Morse Chain Co., Ithaca, N.Y.

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Curtis Pneumatic Machinery Co., St. Louis, Mo.

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Manitoba Bridge & Iron Wks. Ltd., Wpg., Can.

Northern Crane Works, Walkerville.

Tallman Brass & Metal Co., Hamilton.

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Rice, Lewis & Son, Toronto, Ont.

Whiting Foundry Equipment Co., Harvey, Ill.

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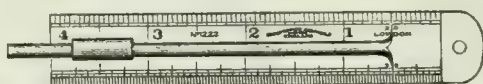
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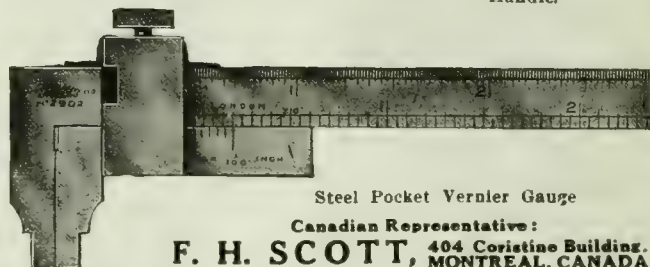
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A weekly newspaper devoted to the machinery and manufacturing interests.

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TORONTO, JANUARY 30, 1919

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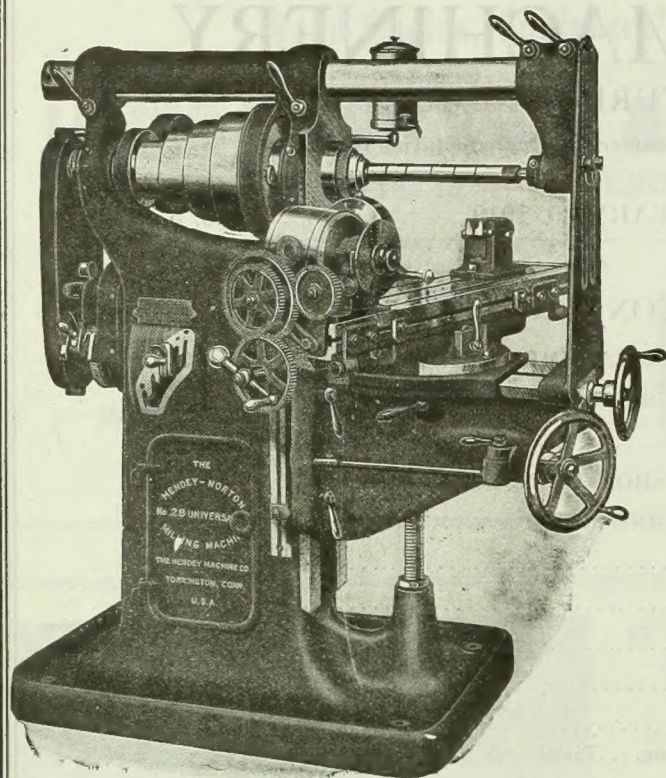
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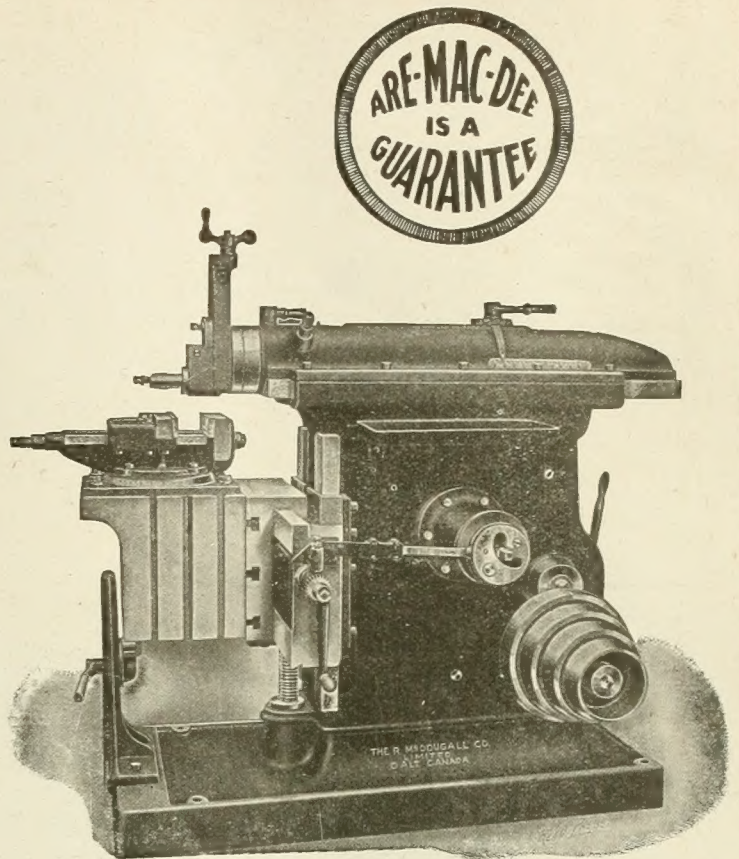
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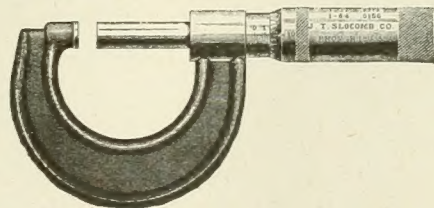
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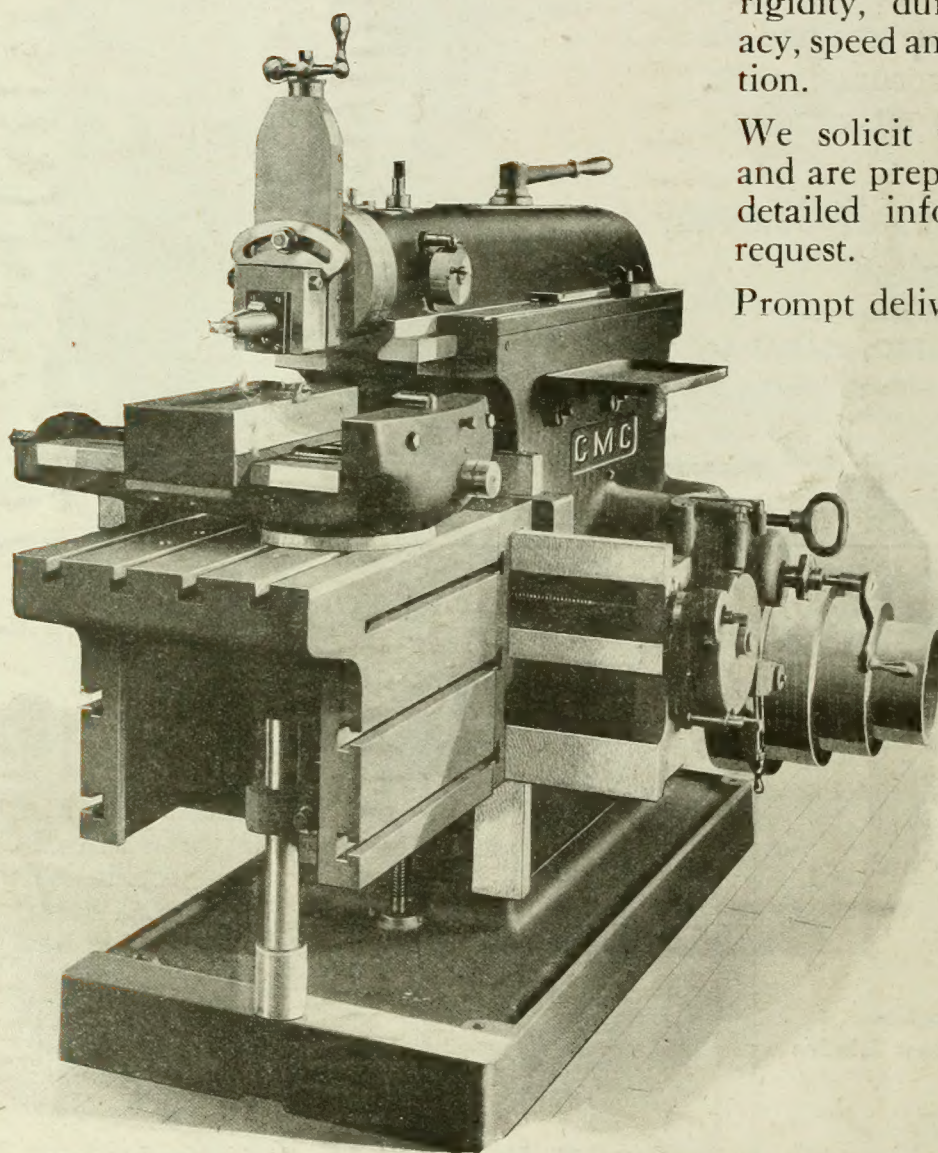
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